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[OFFICIAL NOTICE.]

Annual Meeting, Illinois Gas Association.

ILLINOIS GAS ASSOCIATION,
OFFICE OF SECRETARY,
ELGIN, ILLS., Jan. 21, 1910.

To the Members, Illinois Gas Association: The next meeting of the Illinois Gas Association will be held at the La Salle Hotel, Chicago, Ills., March 15 and 16, 1910. A number of excellent papers have been prepared, and an enjoyable meeting is assured.

Yours truly, C. B. STROHN, Secretary.

[OFFICIAL NOTICE.]

Wrinkle Department, American Gas Institute.

WRINKLE DEPARTMENT, AMERICAN GAS INSTITUTE,
OFFICE OF EDITOR, ELECTRIC AND GAS BUILDING,
ATLANTA, GA., Jan. 10, 1910.

To the Members of the American Gas Institute: Please forward contributions for the Wrinkle Department to the above address. I would suggest that each manager address a letter of solicitation to the head of each department of his Company. Kindly assist me in this work I have undertaken, and greatly oblige, Very respectfully yours,

R. C. CONGDON, Editor.

[SPECIAL OFFICIAL NOTICE.]

Bureau of Information, American Gas Institute.

DETROIT CITY GAS COMPANY,
ENGINEERING DEPARTMENT,
DETROIT, MICH., Nov. 26th, 1909.

To the Members, American Gas Institute: Send questions to be submitted to the Bureau of Information for answer to V. F. Dewey, Chairman, Gas Office Building, Detroit, Mich. The Bureau of Information respectfully solicits your troubles. Yours respectfully,

V. F. DEWEY, Chairman.

[Special Correspondence by Telegraph.]

THE FORTIETH ANNUAL MEETING OF THE NEW ENGLAND ASSOCIATION OF GAS ENGINEERS.

YOUNG'S HOTEL, BOSTON, MASS., Feb. 16, 1910.

Dear JOURNAL: The 40th annual meeting of the New England Association of Gas Engineers was opened this morning with President Africa in the chair and the usual meeting room well filled. The spring-like weather probably had much to do with the size and the cheerful appearance of the gathering. The usual routine work was speedily set in motion, preliminary to the Presidential Address, which, when reached, proved an able address, of great interest, and also developed a rather unusual order, in that it was presented to be subject to discussion. This resulted as anticipated in opening the way for effectually emphasizing the various subjects advanced and was surely an improvement over the usual committee report. Aside from the purely technical matters contained in the Presidential Address, he stated that of the original membership but two remained—Mr. Coggeshall, of Fitchburg, and Mr. Sherman, of New Haven. The former was in attendance in the afternoon and delighted the audience by making some interesting and appropriate remarks. Following the discussion of the President's Address, Mr. Benjamin J. Bean read a most interesting paper entitled "Some Single Unit Installations," which, with its discussion, filled the time of the morning session.

The first order for the afternoon session was the election of officers, resulting as follows:

President.—Mr. W. H. Snow.
Vice-Presidents.—Mr. D. D. Barnum and Mr. J. A. Coffin.
Secretary and Treasurer.—Mr. N. W. Gifford.

The responses of President Snow and Vice-President Barnum were short and to the point, that of the former being especially well re-

LIBRARY OF CONGRESS FEB 21 1910 SMITHSONIAN DEPOSIT.

ceived. Mr. Coffin was unfortunately unable to be present, as he was laid up with a sprained ankle. This did not deter him, however, from expressing his thanks, over the long distance 'phone. The admirable paper of Mr. Barnum, "Further Data on the Worcester Retort House," was next read, which produced a very thorough and highly valuable discussion, the remarks of Dr. Elliott and Messrs. Carroll Miller and C. H. Nettleton being especially well received. This closed the proceedings for the day and opened the way for a pleasant dinner which is to be served this evening.—R.

YOUNG'S HOTEL, BOSTON, Feb. 16, 1910.

Dear JOURNAL: The annual dinner, which was held as usual in the Banquet Room of Young's Hotel, began promptly at 6:30 P.M., and proved to be one of the most successful ever held, which means much, for these banquets have always had a spirit of good-fellowship which is seldom approached in our various gatherings. President Africa, as toastmaster, as usual kept all of us in good humor by his many pleasantries. That many things of serious import were discussed can be but evident when the speakers include such men as W. H. Snow, "Chief" W. H. Bradley, E. N. Wrightington, J. D. Shattuck, C. W. Hare, "Fred." Shelton, John Williamson, Chas. F. Prichard, Henry L. Doherty and C. H. Dickey.—R.

YOUNG'S HOTEL, Feb. 17, 1910.

Dear JOURNAL: The Thursday morning session was devoted to the Management of Water Gas Generators, by Mr. John F. Wing, of Everett, and Maintenance and Selling Methods of Gas Lamps, by Mr. A. R. Burr, of New Haven. The interest was sustained through out the entire session, and we are now leaving with the remembrance of a most successful meeting.—R.

[Special Correspondence by Telegraph.]

THE SECOND ANNUAL MEETING, SOUTHERN GAS ASSOCIATION.

HOTEL PATTEN, CHATTANOOGA, TENN., Feb. 16, 1910.

Dear JOURNAL: The second annual meeting opened under fair skies with some 30 members in attendance, under the guidance of President R. C. Congdon, most ably assisted by Secretary Ferrier. We were welcomed in true Southern style by Mayor Chambliss and answered in the like by our "Tom" Miller, the Society's first President. We are starting on the record year with no less than 17 new members, and things are just humming. The various reports were promptly dispatched.—T.

HOTEL PATTEN, Feb. 17, 1910.

Dear JOURNAL.—The weather might be termed rather damp, as it is raining "cats and dogs," but this has had no effect upon the interest in the proceedings. The Banquet proved to be a great success, and another song hit may be recorded in gas circles—"I love my Husband but—Oh you Gas Range." The ladies were not present to applaud this offering as they were enjoying a theater party.—T.

HOTEL PATTEN, Feb. 18, 1910.

Dear JOURNAL.—The feature of to-day was the auto ride to Chickamauga Park, which proved less strenuous than the technical sessions, but nevertheless enjoyable. Mr. Macbeth's lecture in the evening closed our sessions, and we are looking forward to Montgomery, Ala., in 1911.—T.

BRIEFLY TOLD.

OBITUARY, MR. AUSTIN C. WOOD.—One of the pioneers as well as one of the most respected men in the fraternity died at his home in Syracuse, N. Y., on January 22, at the age of 82. Mr. Wood was born in Northampton, Mass., June 29, 1827, and went to Syracuse in the early fifties, where he remained a resident for 54 years. He was one of the oldest Masons of the city, and was admitted to honorary membership in the Supreme Council, thirty-third degree, September 23, 1884. Mr. Wood was a member of the Masonic Veterans' Association and of the Syracuse Chapter, Sons of the American Revolution. For 40 years he was Superintendent and General Manager of the old Syracuse Gas Company, and an active and progressive spirit in association work. He was President of the American Gas Light Association in 1886, and was an honorary member of both the New England and the Western Associations. Mr. Wood is survived by two sons, Mr. William A. Wood, Vice-President and Engineer of the Boston Consolidated Gas Company, and Mr. George A. Wood, Cashier of the State Bank, of Syracuse.

PUBLIC SERVICE COMMISSION, SECOND NEW YORK DISTRICT, COMMITTEE CONFERENCE ON CALORIMETRY.—The Committee of the Empire State Gas and Electric Association, appointed on the 1st inst.,[1] headed by Chairman R. M. Searle conferred with Messrs. Hazzard, Stone and Crowell, acting for the Commission, at Albany on the 11th inst. The subject of the suitability of various instruments was the main topic of discussion, and no facts of any considerable importance were brought out.

STEVENS ALUMNI DINNER.—At the 9th annual dinner of the Alumni of Stevens Institute, which took place at the Hotel Astor, New York, the evening of the 12th inst., nearly 300 men enthusiastically cheered President A. C. Humphreys when he presented his programme for the development of Stevens. He announced that he had recently received $63,500 of the $1,250,000 which he expects to raise for the purchase of the Castle Point estate, the erection of several buildings, including a dormitory, a mechanical laboratory and an electrical laboratory, and to provide an adequate endowment fund. What is immediately required is the sum of $400,000 for paying off the debt still remaining on the athletic field and for acquiring the other necessary real estate for the growing needs of the Institute. The other speakers included Dr. H. S. Pritchett, President of the Carnegie Foundation for the Advancement of Teaching; Col. E. A. Stevens and Messrs. Hosea Webster, '82, H. M. Brinckerhoff, '90, President of the Alumni Association, and E. H. Peabody, '90, who was toastmaster. Mr. Wm. O. Ludlow, '92, showed a number of lantern slides of the buildings and grounds and the professors, both old and new, and Mr. B. F. Hart, Jr., '87, sang some original songs written by E. H. Peabody for the forthcoming Stevens Song Book. At intervals during the evening the whole company joined in singing the old college songs, and every few minutes there would be a class cheer or college yell. In addition to the speakers many of the Trustees were at the guest table, including Dr. Edward Weston and Messrs. Henry P. Davison, Anson W. Burchard, '85, John Aspinwall, '81, F. B. Kirkbride and Henry Torrance, Jr., '90. Among those at the class tables about the room were Messrs. John A. Benzel, '84, President of the American Society of Civil Engineers; John W. Lieb, Jr., '80, Vice-President of the New York Edison Company; J. E. Sague, '83, of the New York Public Service Commission, and W. D. Hoxie, '89. The spirit of enthusiasm shown at the dinner was so great that President Humphreys and the Institute authorities feel greatly encouraged and believe that the plans for the development of Stevens will be carried through in the near future.

CURRENT MENTION.—

MR. F. W. STONE, of Ashtabula, O., is to edit the Wrinkles for the Natural Gas Association of America, at their annual meeting in Oklahoma City, Okla., on May 17, 18 and 19, and requests that any contributions be sent in as early as possible.

MR. W. H. PEARSON, JR., who has been with the Consumers Gas Company, of Toronto, Canada, for the past 33 years, and who for nearly 30 years has been Engineer, has handed his resignation to the Company. He has formed a partnership with Mr. G. A. Bronder, of New York city, to manufacture gas works apparatus.

A NUMBER of changes in Michigan are announced as follows: Mr. Benjamin C. Robinson, for several years Manager of the Flint (Mich.) Gas Company, has resigned, and will take a short rest before making other connections. He will be succeeded by Mr. Homer M. Eaton, of Saginaw, Mich. Mr. Eaton's position will be taken by Mr. Samuel Ball, of Bay City, Mich.

THE Utica (N. Y.) Gas and Electric Company is to lose the services of Mr. C. Austin Greenridge on March 1st, when he will join the forces of the J. G. White Company, of New York city.

MR. EMIL G. SCHMIDT has resigned his position of General Manager of the Peoria (Ills.) Gas and Electric Company, but has made no announcement of his plans for the future. The city has been making an investigation of the water works at Peoria, and it is rumored that the gas works are to be next in line.

MR. J. W. SALLEE has succeeded Mr. E. G. Anderson as Manager of the Hemet-San Jacinto (Cal.) Gas Company.

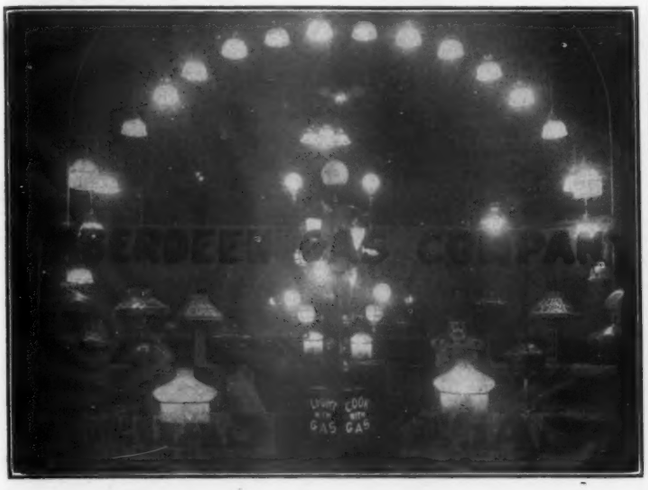
MR. EDWARD LEYBOLT has resigned as Superintendent of the Geneva (N. Y.) Gas Company, to accept the position of General Manager of the Portsmouth (N. H.) Gas Company, vice Mr. F. C. Butler, who goes to Rochester, N. H.

AMONG the towns and villages which will soon have a gas supply are: Plainville and Windsor Locks, Conn.; Rockland, Whitman, Weymouth and Braintree, Mass.; Decorah and Ames, Ia; Laurel, Del.; Virginia, Minn.; Glendale, Tropico and Casa Verdugo, Cal.; Scotia, N. Y.

1. See A. G. L. J., Feb. 7, 1910, p. 244.

Display Window at Aberdeen, S. D.

Manager S. B. Hanley, of the Aberdeen (S. D.) Gas Company, may or may not be an illuminating engineer, but that he takes pride in his product is evident from the excellent window display illustrated herewith. A novel feature is the square post in the center which



revolves at a rate of two turns per minute. The bracket lamps being kept burning.

Pipe Bending.

[Prepared for the JOURNAL, by "R."]

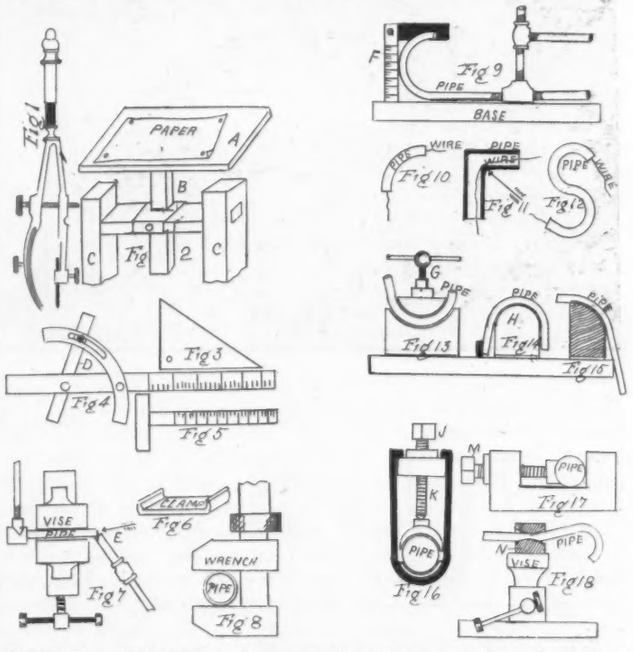
There are always a number of pipes to bend in modern building operations, and these pipes often need to be bended to certain angles. In watching the overhauling of some of the constructive work in an old building recently, the writer observed that the workmen were obliged to do considerable bending of pipes to accommodate the lines of wires carried in pipes throughout the building, and there are occasions when the contractor and builder needs a system of pipe bending devices for creating curves, angles, turns, etc., at times when there is no pipe fitter or plumber at hand. Building operations are often delayed waiting for an expert in the pipe bending line. Therefore we refer to some of the contrivances utilized by carpenters, masons and general constructors in the erection and altering of buildings, when the bending of pipes becomes necessary.

First of all, it is advisable to possess means for making diagrams of proposed changes in curves or adjustments of the pipes, for to go at it recklessly usually means failure. If you make a drawing of the original form and a drawing of the form desired, then, when you strike an incorrect curve, you can readily get your line back to the original condition without varying the form. You avoid the necessity of guesswork.

A very good sketching stand is exhibited in Fig. 2. This is better than doing the work on the uneven surface of the carpenter's bench or on a box. You can build one of these stands with lumber which you can gather about the shop. The desk *A* is arranged on the top of the post *B*, at the proper angle. You can mortise tenon the block of the desk to the post. Then the post is slotted into the cross piece which extends between the uprights *C*, *C*. There is a pin and adjustable holes in the post, so that you can bring up the desk to the required elevation. Pin your drawing paper on the desk top and then you are ready for work. You can draw you sketches. Common sketching instruments will be found to be very convenient, and the pair of dividers shown in Fig. 1 should be included in the usual collection of drawing tools.

Fig. 3 shows the form of tri-angle which you will not overlook in making up the selection of sketching devices, as this device is a useful one. The home made drawing instrument sketched in Fig. 4 is necessary, as with it you can get angles of pipes. The arm *D* is arranged so that the curved piece can be moved and swung to a desired position. In connection with this tool, the common design of T-square is very handy, one of which is shown in Fig. 5.

Let us come to the actual operation of bending the pipes. Perhaps a pipe is to be curved to pass through a wall of masonry, and it is to carry a line of electrical wire. It is quite necessary that the curve in the pipe be uniform. I have seen workmen clap the pipe into the jaws of a vise and proceed to club the pipe about its angle with a hammer or mallet. Something must give away. Usually the pipe itself is broken under the heavy blows and we get the condition of wreckage demonstrated in Fig. 7 at *E*. Of course, the pipe is ruined. There is nothing inside it to support the walls. The pipe is not even heated. There are no soft clamps as in Fig. 6, to cover the hard, currugated steel jaws of the vise, and consequently these steel jaws cut into the pipe wall. I would arrange to use soft metal clamps for faces for the steel jaws of the vise. This will protect the surface of the pipe. Some people grasp the wrench on the pipe, while the pipe is in the grip of the jaws of the vise and endeavor to create the required bend in the pipe through muscular exertion. The jaws of the wrench on the pipe, as in Fig. 8, are nearly as bad as the jaws of the vise on the pipe. In order to bend the pipe cold, proceed to pack them. That is fill the interior with clay, well packed; rosin which can be melted and poured; or use putty or other filler of a similar packing capacity. Still, you need specially designed and built forms on which to bend cold, even if the interior walls of the pipes are protected with filling. Much depends upon the nature of the bend. Often a complete bend is needed, as in Fig. 9. The common type of T square can be used to determine the volume of the bend, as at *F*. Perhaps you want to get the bend so as to form an elbow for the wire, as in Fig. 10. Then you need a form which will create this description of bend. The square turn should be left out in wire service, for the reason that when you use a turn of this kind, the wire is inclined to contact with the sharp edge, as at the arrow point in Fig. 11, and this edge will soon cut off the wire. More often you require the rounded forms, as in Fig. 12. Hence, we recommend forms of the character presented in Figs. 13, 14 and 15. You can rig up the base plank for supporting several of these designs of forms. The forms can be cut out from hard wood, to the required proportions, and then can be bolted or set-screwed securely to the base. This base can rest upon a bench or upon trestles in the work room.



In the form Fig. 13, we show a sectional view, on the other side of which is the necessary upright for holding the revolving spiral screw (like a screw press) for compressing the top. The pipe is properly filled. Then it is stretched across the form and held in place while the lever of the screw is turned. The pressure is quickly brought to bear upon the pipe by the descending form, and the pipe gradually gives, until the complete half circle is closed and made. Sometimes a pin is fixed on one side of a complete round block, as at *H* Fig. 14 and the pipe (if small) is bent over by hand. You can bend a small pipe cold, if packed right, by striking it over a form like that in Fig. 15. Of course, various descriptions of devices are needed in order to get positive grips on pipes under certain conditions. Fig. 16 is a clamping form which I have used with good results. The black strap is wrought iron, welded to fit over the piece as shown. The black is made for the spiral shaft and this shaft (marked *K*) is turned by the head *J*. Hence the point of the screw, with its pad, can be adjusted on the pipe wall, tightened up, and made to hold the pipe indefinitely.

A very simple form of dog is shown in Fig. 17 in which the clamp is tightened by turning the head of the adjusting screw at *M*. A handy kind of a form for common bending of light pipes is shown in Fig. 18 in which the ordinary vise is employed to hold the wood form *N*. This form is cut out, hour glass style, and to bend a pipe it is only necessary to insert the pipe in the form, as shown, and apply the pressure.

[CONTINUED FROM PAGE 298.]

REPORT OF PROCEEDINGS, FOURTH ANNUAL MEETING, AMERICAN GAS INSTITUTE.

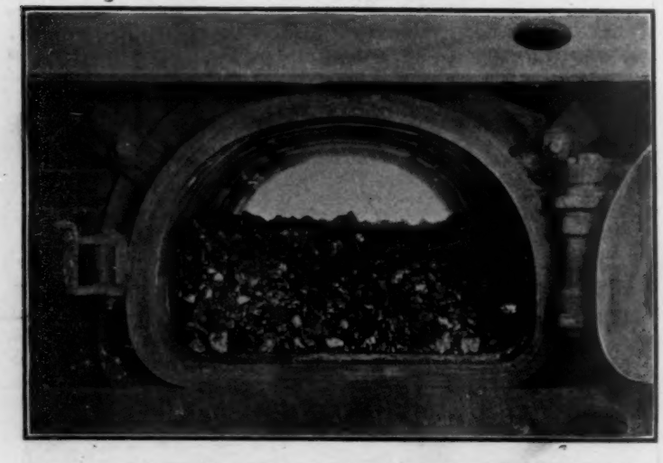
HELD IN THE HALL OF ELKS, DETROIT, MICH., OCTOBER 20, 21 AND 22, 1909.

SECOND DAY—MORNING SESSION, Oct. 21, 1909.—*Technical Session.*

A DESCRIPTION OF A RETORT HOUSE.—*Continued.*

SUMMARY.

The stack is capable of producing a very large amount of gas. In 5-hour charging we have reached as high as 187,000 cubic feet per bench in 24 hours. At our present rate of charging—7 hours—we make 150,000 cubic feet per bench in 24 hours. The coke is extremely good. Practically no breeze. Tar is excellent—clear and limpid. The yield of gas per pound of coal—5.90 to 6 feet—5.95 cubic feet by 2,240 pounds gives 13,328 cubic feet to ton of coal. Candle power, 17. This is an average candle power from an innumerable number of tests, by different people. The burner used is a Sugg, old D Argand burner, burning 5 cubic feet of gas per hour. The test of the gas by the English Carpenter burner, called the "Metropolitan Argand, No. 2" gave an average of 18.57 candles. Corrections were made for all the figures in this paper for temperature—60°, barometer—30 inches. Candle feet, 5.95 × 17 = 101.15 candle feet. Specific gravity .440. B. T. U., 627.



At this year's meeting of the Institution of Gas Engineers, held in London, June, 15th, 1909, I saw it reported that the gas made in the Woodall-Duckham plant, also that made in the Young and Glover system, is tested with Metropolitan burner No. 2. I think this is as it should be. The gas should properly be tested by the burner best adapted to it, although the Gas Commission seem to think the gas should be tested with a Sugg Argand burner, burning 5 cubic feet per hour. If we use the Metropolitan burner No. 2 in our experiments, as stated above, expert tests show 18.57 candles. This, with a make of 5.95 cubic feet to the pound of coal, would give 110.49 candle feet.

Coke used in producers, 15 3/10 to 15 4/10 pounds of coke for each 100 pounds of coal carbonized.

Labor.—The labor required to operate this house is very small indeed. It would hardly be wise to have a smaller number of men about a house of this size. The ease with which the house is worked in every way is remarkable.

Analysis of Gas.—The following analyses of the gas were made by Mr. C. W. Hinman, former State Inspector of Massachusetts. We have a great many tests made by our own chemists and others, but I thought better to submit these made by an outside expert.

Illuminants	5.59	4.85
Marsh gas	36.12	33.36
Hydrogen	49.23	51.14
Carbonic oxide	6.31	7.39
Nitrogen	1.52	1.95
Oxygen	0.00	0.00
Carbonic acid	1.23	1.01

Formula of hydrocarbon equivalent to illuminants, C 2.56 H 5.32; C 2.75 H 5.04.

WORCESTER, MASS., Feb. 16, 1909.

Analyses of gas coal and coke, Laboratory of Worcester Gas Light Company, February 11 to 16.

Coal from Penn. Nos. 2 and 3 Mines.

	Coal No. 1.	Coal No. 2.	Coal No. 3.	Coal No. 4.	Coal No. 5.
Moisture	1.16	1.35	1.38	1.51	1.17
Vol. matter	34.07	34.30	34.29	34.81	35.12
F. carbon	58.87	56.09	56.98	56.80	56.76
Ash	5.90	8.26	7.35	6.88	6.95
	100.00	100.00	100.00	100.00	100.00
Sulphur	0.78	0.76	0.78	0.84	0.96

Sulphur determined by Mr. Keyes.

Coke.	Coke No. 1.	Coke No. 2.
Moisture	(Dried)	....
Vol. matter	1.43	2.09
F. carbon	87.77	87.81
Ash	10.80	10.10
	100.00	100.00

Sulphur 0.57

EDW. F. WILSON,
Chemist, Westmoreland Coal Company.

Analysis of Tar.

Water	5.25	Specific gravity	1.24 (28 Be)
Light oils	1.80	Naphthaline	6.08
Heavy oils	9.50	Carbon	28.0
Pitch	83.45	Tar taken from a drip 400 feet from the retort house.	
	100.00		

Temperatures of Combustion Chamber.—Taken by Wanner pyrometer.

1909. Date Feb.	No. 4.	No. 5.	No. 6.	No. 7.	No. 8	No. 9.	No. 10.
1	2,438	2,455	2,494	2,438	2,438	2,471	2,471
2	2,422	2,422	2,455	2,438	2,422	2,494	2,455
3	2,390	2,406	2,438	2,406	2,390	2,438	2,422
4	2,438	2,406	2,438	2,406	2,438	2,455	2,455
5	2,422	2,390	2,422	2,406	2,390	2,422	2,422
6	2,455	2,438	2,438	2,422	2,422	2,438	2,455
8	2,406	2,406	2,471	2,455	2,438	2,438	2,455
9	2,406	2,406	2,438	2,455	2,438	2,422	2,422
10	2,390	2,390	2,438	2,438	2,422	2,438	2,438
11	2,398	2,406	2,438	2,438	2,438	2,428	2,455
12	2,438	2,438	2,438	2,455	2,438	2,438	2,455
13	2,406	2,406	2,438	2,455	2,471	2,438	2,438
14	2,406	2,406	2,494	2,455	2,438	2,438	2,471
15	2,422	2,422	2,438	2,422	2,455	2,438	2,422
16	2,438	2,438	2,471	2,455	2,455	2,438	2,471
17	2,390	2,390	2,494	2,455	2,455	2,455	2,471
18	2,471	2,471	2,494	2,455	2,438	2,438	2,438
19	2,471	2,494	2,494	2,494	2,455	2,455	2,494
20	2,540	2,494	2,494	2,494	2,471	2,494	2,494
21	2,455	2,471	2,471	2,438	2,438	2,438	2,455
23	2,494	2,494	2,517	2,494	2,455	2,455	2,517
24	2,494	2,417	2,540	2,540	2,540	2,494	2,540
25	2,438	2,438	2,494	2,471	2,471	2,471	2,471
26	2,471	2,455	2,494	2,471	2,438	2,438	2,494
27	2,438	2,438	2,455	2,455	2,438	2,422	2,455

Minimum—2,390°. Maximum—2,540°. Difference—150°.

Temperatures of Combustion Chamber.—Taken by Wanner pyrometer.

1909. Mar.	No. 4.	No. 5.	No. 6.	No. 7.	No. 8.	No. 9.	No. 10.
1	2,438	2,438	2,471	2,438	2,455	2,438	2,455
2	2,422	2,422	2,455	2,422	2,422	2,422	2,455
3	2,438	2,422	2,438	2,422	2,406	2,422	2,438
4	2,406	2,422	2,438	2,406	2,406	2,406	2,438
5	2,422	2,438	2,422	2,406	2,406	2,422	2,438
6	2,422	2,438	2,438	2,406	2,406	2,406	2,455
7	2,406	2,406	2,438	2,390	2,390	2,406	2,422
8	2,422	2,438	2,438	2,390	2,390	2,406	2,438
9	2,422	2,422	2,438	2,422	2,406	2,422	2,438
10	2,438	2,438	2,438	2,406	2,406	2,430	2,438
11	2,406	2,406	2,438	2,406	2,406	2,422	2,422
12	2,422	2,422	2,438	2,438	2,422	2,422	2,438
13	2,422	2,422	2,438	2,438	4,406	2,422	2,422
15	2,422	2,422	2,422	2,406	2,422	2,438	2,438
16	2,406	2,406	2,422	2,438	2,422	2,438	2,438
17	2,422	2,406	2,422	2,438	2,422	2,422	2,438
18	2,422	2,422	2,438	2,422	2,438	2,422	2,438
19	2,406	2,422	2,438	2,438	2,422	2,406	2,455
20	2,422	2,422	2,455	2,438	2,422	2,438	2,438
21	2,406	2,422	2,422	2,422	2,422	2,422	2,438
22	2,406	2,422	2,455	2,422	2,422	2,455	2,438
23	2,406	2,422	2,422	2,438	2,422	2,422	2,438
24	2,422	2,455	2,494	2,494	2,494	2,494	2,517
25	2,422	2,422	2,455	2,455	2,406	2,422	2,434
26	2,406	2,422	2,438	2,438	2,422	2,422	2,438
27	2,422	2,438	2,455	2,438	2,422	2,438	2,422
29	2,406	2,471	2,471	2,455	2,422	2,455	2,455
30	2,406	2,471	2,471	2,455	2,422	2,471	2,471
31	2,406	2,471	2,471	2,455	2,438	2,471	2,471

Large Yield.—The large yield of gas per pound of coal is due to perfectly legitimate methods of carbonization; first, the gas is in the coal.

It has been the experience of all gas engineers that if the coal is left in the retort long enough the yield could be obtained; the charges are left in 7 hours, exposed to a heat that will not injure the candle power. The heats are uniform throughout each square foot of retort floor. The charges of coal are very uniform and evenly laid.

The retort material (Ricon) has over 20 per cent. more conductivity than ordinary clay material. We are thus able to get the necessary heat into the retort without having an excessive temperature on the outside, in the setting and in the combustion chamber. The retorts show a difference in temperature between the inside and outside of same, of 200° to 250°, depending upon the amount of carbon in the retort.

These desirable conditions are obtained and uniformly maintained by having large grate area, large producer capacity and a uniform condition of fuel bed.

High Candle Power.—This may be explained as follows: The large charges of coal leave a minimum amount of retort surface to act upon the gas as it is generated, yet enough heat is given to the gas to make the hydrocarbons permanent gases. Not only is the relative amount of retort surface decreased by the small space above the coal, but the rate of flow is faster, and consequently the time that the gas is exposed to the heated surface of the retort is shorter, all of which tends to decrease the dissociation of the hydrocarbons.

The dissociation is further controlled by the comparatively low heats we are able to maintain, and yet carbonize the coal in 7 hours, due to the Ricon fire material.

The above are positive reasons. We see by the analysis that the nitrogen is very low, and that the carbonic acid and oxide is no more than comes from the distillation. These results are accomplished by keeping as low a pressure in the retort as possible and yet having the pressure at all times slightly more than the pressure in the setting. Four-tenths in the retort and one-tenth in the setting is what we maintain. The dissociation of the hydrocarbons is further prevented by the fact that the heat units are uniform throughout the entire retort service; each retort is evenly heated its entire length. There are no points or spots of high intensity.

Balance by Weight.

Gas.—Weight of 1 foot of air × gravity of gas × feet per pound .0761 × .44 × 5.93 = .198.

Coke.—Coal minus volatile matter in coal + volatile matter in coke 1 — .3503 + .0176 = .667.

Tar.—Tar gravity × 8.33 × gallons per ton ÷ 2,240; 1.1 × 8.33 × 13½ ÷ 2,240 = .055.

Hydroscopic Water.—Average of analysis of coal = .013.

Ammonia.—5.62 pounds NH ÷ 2,240 = .0023.

Sulphur.—Half the total sulphur in coal = .0065.

Water Formed.—The ultimate analysis of Westmoreland coal gives 7.64 per cent. oxygen. The analysis of the gas gives 1.43 carbonic acid and 6.48 carbonic oxide; 1 pound coal gives 5.95 feet gas; 1.43 × 5.95 gives .085 foot carbonic acid; 1 foot carbonic acid weighs .11637; .085 × .11637 = .0098 pound; .085 × .11637 = .0098 pound; CO_2 = 12 + 32; O_2 = 32/44 × .0098 = .0071 pound O_2 for the carbonic acid; 6.43 CO × 5.95 = .382 foot CO; 1 foot CO weighs .074; 382 × .074 = .0282 pound; CO = 12 + 16; O = 4/7 × .0282 = .01612. Total oxygen = .00716 + .01612 = .02328. Oxygen in coal — oxygen in CO_2 = oxygen in water formed; .0764 — .0232 = .0532 pound oxygen. This oxygen forms hydroxal (HO). The hydrogen would be 1/16 of .0532 or .0033. Total weight HO formed would be .0565.

See paper by Porter and Ovitz in AMERICAN GAS LIGHT JOURNAL, Sept. 14, 1908, p. 447.

Balance by Weight.—Resume.

	Totals from 1 Lb. Coal.		Totals from 1 Lb. Coal.
Gas	.198	Ammonia	.0025
Coke	.667	Sulphur	.0065
Tar	.055	Water formed	.0565
Hydroscopic water	.013		
			.9985

Balance of Heat Units.

1 pound of Westmoreland coal		13,500
1 pound of our coke		12,779
1 pound of the tar		15,943
1 pound of coal		13,500
Coke, .667 × 12,779		8,523
Tar, .055 × 15,943 (14 gallons)		876
Gas, 5.95 × 627	3,730	
Hydrogen in water formed .0033 × 61,523	203	13,332
Unaccounted for		168

Return Flue Gas Data.

Size of producer: 4′ — 1″ × 5′ — 5″ × 7′ — 3″. There are two producers to each bench of 8 retorts.

Temperature under grates	500° F.
" of fuel bed and outlet producer	1,800°
" of combustion chamber	2,431°
" underneath the top arch	2,316°
" at top of recuperation	2,011°
" main flue	1,058°
" inlet blower	950°
" retorts	2,009°
" secondary air	1,841°

Difference in temperature inside and outside upper retort — 200° — 250°.

Analysis of Gases.

	Return Flue.	Oxide Flue.	Outlet Bench.	Main Flue.
Co_2	9.3	10.0	18.7	15.2
O_2	11.6	0.4	1.1	5.7
CO	0.0	18.7	0.0	0.0
N_2	79.1	70.9	80.2	79.1

The making of producer gas for the heating of the retorts for distilling coal is a very important part of any discussion of a retort house, and the subject, if considered in its entirety, is not only interesting, but becomes quite complicated and involved if it is followed out to a logical conclusion. The subject may be divided as follows: The prevention of clinkers. The generating and transmission of heat. Economy. Regulation.

The principal impurities in the fuel that cause the clinkers are silica, calcium, magnesia and iron. We, therefore, have the problem of making producer gas and keeping the temperature of the fuel bed below the fusing point of the above. This may be attempted in three different ways: 1. By mixing waste gases with the non-heated primary air, and regulating the amount of oxygen used per hour per pound of fuel at such a point that while the carbon will unite with the oxygen to form carbonic oxide, the temperature will not be high enough to form clinker or to break up the carbonic acid. We have found that a temperature of 1,800° will accomplish this result. This condition can be obtained by regulating the proportions, the amount, the temperature, the pressure and rate of flow of the mixture. This method does away with all clinker whatsoever, and is the method of operating the Worcester retort house. 2. By using waste gases instead of steam; the heat absorbed by the dissociation of the CO_2 keeps the temperature below a given point. 3. By introducing steam with the primary air, and the heat absorbed in dissociation of the H_2O, keeps the temperature of the fuel bed below the fusing point of the ash.

Producer Gas.

First Process.—In discussing the problem of making producer gas, we are, at the outset, confronted with the question of whether the carbon and oxygen unite to form carbonic oxide, and upon further action to form carbonic acid, or does the carbon and oxygen first form carbonic acid which is reduced upon further reaction to carbonic oxide. From a study of the authorities on this subject, it would seem to be a question that must be decided in each particular case, and the conditions governing are temperature, pressure, rate of flow, and the mixture entering the fuel. Our analyses are made daily with the Orsat apparatus, and care is taken to have the solutions fresh.

The mixture in the return flue and oxide flue show the following:

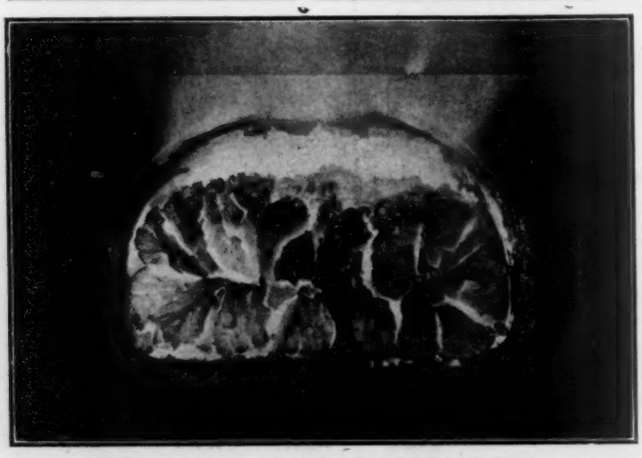
	Return Flue.	Oxide Flue.
CO_2	9.3	10.0
O_2	11.6	0.4
CO	0.0	18.7
N_2	79.1	70.9

The coke gives an analysis as follows:

Dried Sample.

Volatile matter	2.08	89.9
Fixed carbon	87.81	
Ash	10.10	

We will first consider the practical case of one of the Worcester producers and will figure the volume of gas passing through each pound of combustible, the heat that is available from this fuel for heating the retorts, and the total fuel used, including that which is necessary for running the blower, and get the net British Thermal Units available per pound of combustible.



We first have the action $O_2 + 2C = 2CO$ and one volume of O_2 becomes two volumes of CO, omitting the volume C, which is negligible. In each pound of fuel, there is 899 pound combustible. One pound combustible requires 1.33 pounds O_2 (figured on 20.9 per cent. O_2 by volume).

$.899 \times 1.33 = 1.1956$ pounds O_2 required per pound of fuel.

In the mixture there is 11.6 per cent. O_2 or .116 foot O_2 per foot of mixture. One foot O_2 weighs .084 pound; $.116 \times .084 = .00974$.

$$\frac{\text{Oxygen required}}{\text{Oxygen per foot mixture}} = \frac{1.1956}{.00974} = 122.7 \text{ feet of mixture required}$$

per pound of fuel.

This 122.7 increases in volume in passing through the producer as 1 volume O_2 becomes 2 volumes CO, and 18.7 per cent. CO represents an increase of 12.6 feet, and the 122.7 feet becomes 135 feet.

The secondary air is added to the producer gases and the CO becomes CO_2; thus, $2CO + O_2 = 2CO_2$; 2 vols. + 1 vol. = 2 vols., and the 135 feet is increased by the nitrogen of the secondary air.

The analysis shows 18.7 per cent. CO; 18.7 per cent. of 135 feet = 25.2 CO. $\frac{25.2}{2} \times 4 = 50.4$ N_2, to be added to 135 = 185 feet.

So that we have 135 feet of gas that conveys the heat from the producer to the combustion chamber and 185 feet that conveys it to the retorts.

Second Process.—Assuming that nearly all the carbonic acid is broken up in passing through the fuel. To break up any CO_2 it is necessary to have a temperature of at least 1,877° F. We will assume that all the CO_2 of the waste gas is broken up except 3 per cent. and also that we get the same reaction from the oxygen as in the first process.

Return Flue Mixture.

CO_2	9.3 per cent.	11.4 feet.
O_2	11.6 "	14.3 "
CO	0.0 "	0.0 "
N_2	79.1 "	97.0 "

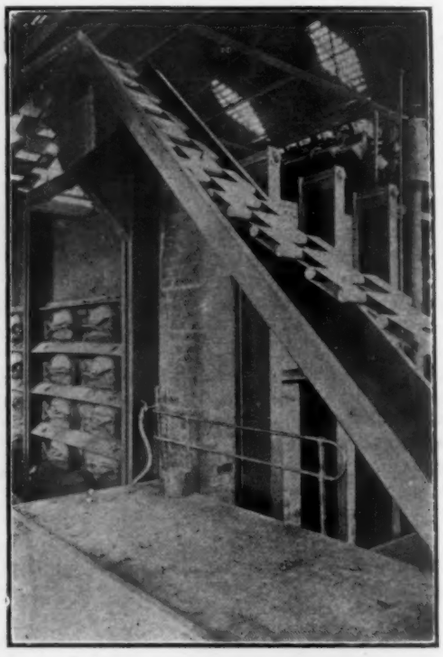
The mixture will be increased in volume in passing through the fuel by the oxygen uniting with the carbon and by the carbonic acid breaking up, and the producer gas will work out as follows:

Analysis of Producer Gas.

Carbonic acid	5.4 feet.	3.7 per cent.
Oxygen	0.0 "	0.0 "
Carbonic oxide	40.6 "	28.5 "
Nitrogen	97.0 "	67.8 "
	143.0	

The coke gives .899 per cent. combustible, and we have seen how there is required 122.7 feet of the mixture for the combustion of 1 pound of coke. This mixture of 122.7 feet become 143 feet.

An additional amount of carbon has been used to break up the carbonic acid thus: 6.3 per cent. CO_2 is broken up; 6.3 per cent. of 122.7 = 7.7 feet of CO_2; $CO_2 + C = 2CO$; $(12 + 32) + 12 = 2(12 + 16)$; 7.7 feet CO_2 weighs .896 pound: .896 pound CO_2 requires .243 pound C or 27 pounds fuel; therefore, for the 143 feet producer gas there is 1.27 pounds fuel or 112.6 feet of gas per 1 pound of fuel to carry the heat from the producer to the combustion chamber. The secondary air is added to the producer gases and the CO becomes CO_2, thus: $2CO + O_2 = 2CO_2$, and the 143 feet is increased by the nitrogen of the secondary air, thus: $40.6 \div 2 = 20.3$, or 76.8 N_2, to be added to the 143, which gives 219.8 feet per 1.27 pounds fuel, or 173.8 feet per 1 pound of fuel, that carries the heat from the combustion chamber to the retorts.



Producer Gas with Steam.

Third Process.—In the case of producer gas where steam is used, we have authentic figures of the amount used per pound of fuel, varying from ½ to a pound. In the paper by W. A. Baehr, Institute Proceedings of 1907, page 791, there is a table giving 0.42 pound water per 1 pound fuel, and I take it that this may be considered good practice.

We have seen that the burning of 1 pound of coke with .899 per cent. combustible matter requires 68 cubic feet of air, and that the 68 feet would become 81 feet in passing through the producer. To this volume of gas would be added the gas formed from the .42 pound steam.

Thus: $H_2O + C = CO + H_2$. $18 + 12 = 12 + 16 + 2$, and the resultant gas would be

$CO = .42 \times \frac{8}{9} \div \frac{1}{2} = .653$ pound
$H_2 = .42 \times \frac{1}{9} = .046$ pound
} equal volumes.

.653 pound CO = 8.8 feet
.046 pound H = 8.8 feet
} 17.6 feet.

This will therefore give 81 + 17.6 = 98.6 feet.

In breaking up the .42 pound steam we have used additional fuel thus: $H_2O + C = CO + H_2$; $18 + 12 = 12 + 16 + 2$.

$C = \frac{2}{9} H_2O = \frac{2}{9} \times .42 = .28$ pound carbon, which = .231 pound fuel or 1.321 pounds fuel for 98.6 feet of gas, which gives 74.6 feet of gas available per pound of fuel for carrying the heat from the producer to the combustion chamber as against 135 in the return flue gas scheme.

In Mr. Baehr's paper, on page 796, he quotes from Dr. Fisher the equation $C + O = CO$, and the composition of the resultant gas would be: CO = 34.7 per cent.; N_2 = 65.3 per cent.; and we will assume that we will get this proportion. Therefore, the composition of our steam producer gas will work out as follows:

CO_2	0.0 per cent.	× 81 feet =	0.0 feet.	
O_2	0.0 "	× 81 " =	0.0 "	
CO	34.7 "	× 81 " =	28.1 "	
N_2	65.3 "	× 81 " =	52.9 "	

From the steam—

CO	8.8	H_2	8.8

Which gives—

CO_2	0.0 feet.	0.0 per cent.
O_2	0.0 "	0.0 "
CO	36.9 "	37.4 "
H_2	8.8 "	8.9 "
N_2	52.9 "	53.6 "
	98.6 "	99.9 "

The oxygen necessary for the secondary combustion would increase

this 98.6 feet as follows: For the 37.4 per cent. or 36.9 feet CO, 56.9 = 18.4 feet O_2 is required, and this increases the volume by 69.9 feet N_2, and 98.6 + 69.6 = 168.2 feet.

For the 8.8 feet H_2, $\frac{1}{2} \times 8.8 = 4.4 = 16.4\ N_2$; 168.2 + 16.4 = 184.6 feet total volume gas per 1.321 pounds fuel, or 139.7 feet of gas per pound fuel to convey the heat from the combustion chamber to the retorts, as compared with 185 for the return flue gas scheme.

Third Process.—If we assume that 1 pound steam per pound fuel is used the results would be as follows: Volume of gas per pound fuel from producer to combustion chamber would be 70.7. Volume of gas per pound from combustion chamber to retorts would be 146 cubic feet.

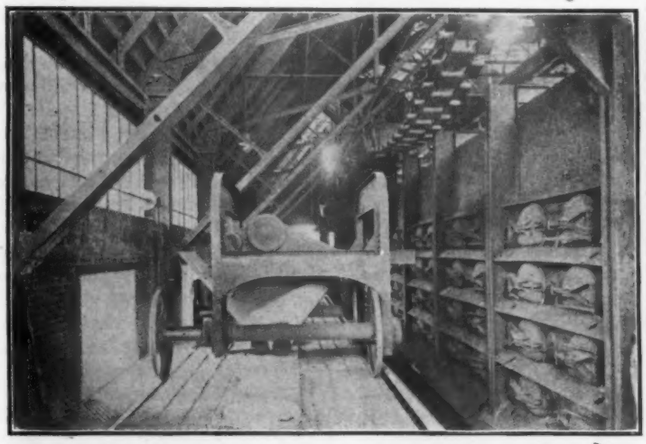
Heating Powers.

First Process.—The heating power of the gas per 1 pound of fuel for the return flue gas system when the CO_2 is not broken up will be: Heat of combustion—

CO = 18.7 per cent. × 135 = 25.2 feet.	
25.2 feet × 323.5 = ...	8,152
Sensible heat—	
CO_2 = 13.2 × .21 × 1,877 × .116 = ...	613
O_2 = O	
CO = 25.2 × .24 × 1,877 × .074 = ...	849
N_2 = 96.2 × .24 × 1,877 × .074 = ...	3,206
Total B.T.U	12,820

In addition to 1 pound of fuel above, there is power used to run the blower for returning the flue gases. This was measured and amounted to .96-horse power per hour per bench, or, at 4 pounds fuel per horse power = 91.1 pounds per day per bench, or 92.1 pounds fuel per 24,555 pounds coal carbonized = .004 pound per 1 pound coal carbonized, or .026 per pound fuel. We therefore have 12,820 B.T.U. per 1.026 pounds fuel or 12,496 per pound fuel.

Second Process.—The heating value of this gas when the CO_2 is broken up will be:



Heat of combustion:		
CO equals 40.6 feet		
40.6 × 323.5	13,134	B. T. U.
Sensible heat—		
CO_2 equals 5.4 × 2.1 × 1,877 × .116	247	
O_2	0	
CO equals 40.6 × .24 × 1,877 × .074	1,353	
N_2 equals 97.0 × .24 × 1,877 × .074	3,233	
	17,967	
Coke necessary to dissociate the CO_2		
CO equals 15.4 × 323.5 equals	4,982	
B. T. U. per pound of coke is 12,779		
4,982 divided by 12,779 equals	0.39	pound coke.
Therefore we have—		
Fuel for combustion	1.00	pound.
" dissociating CO_2	0.39	
" blower	0.026	
Total fuel	1.416	

17,967 divided by 1.416 equals 12,688 B.T.U. per pound fuel.

Third Process.—The heating power of the gas with .42 pound steam per pound of fuel will be as follows:

Heat of Combustion.	B.T.U.
36.9 CO × 323.5	11,937
8.8 H_2 × 326.2	2,870
As sensible heat—	
CO_2 = O	
O = O	
CO = 36.9 × .24 × 1,877 × .074	1,228
H_2 = 8.8 × .409 × 1,877 × .0053	358
N_2 = 52.9 × .24 × 1,877 × .074	1,763
Total B.T.U.	18,156

We have used 1,877° in all three cases as that is the temperature at which the CO_2 and H_2O starts to break up, and it thus serves for comparing the results in all cases under the similar conditions.

We thus have 18,156 B.T.U. per pound fuel for the combustion plus what fuel is necessary to make the .42 pound water into steam and dissociate it, thus:

CO = 8.8 × 323 = 2,842
H_2 = 8.8 × 327 = 2,877
5,719

Latent heat 1 pound of water = 966.
.42 × 966 = 405.
5,719 + 405 = 6,124 B.T.U.
One pound of coke develops 12,799 B.T.U.

Therefore, 6,124 will take .49 pound coke.

Coke for combustion	1.00
Coke for steam	0.49
	1.49

18,156 ÷ 1.49 = 12,453.

Third Process.—The heating power of the gas per 1 pound fuel when 1 pound steam per pound fuel is used instead of .42 pound steam, will be 12,609 B.T.U. per pound fuel.

Tabulated Results.

	Feet, Gas, from Producer to Combust'n Chamber.	Feet, Gas, from Combustion Chamber to Retorts.	B.T.U. per lbs Fuel.
First Process.			
Not breaking up the carbonic acid	135	185	12,496
Second Process.			
Breaking up the carbonic acid	113	174	12,688
Third Process.			
Producer gas with .42 lb. water per lb. fuel.	75	140	12,453
Third Process.			
Producer gas with 1 lb. per water lb. fuel.	70	146	12,609

We, therefore, find that comparing the actual case of return flue gases with the theoretical cases of steam, assuming 100 per cent. efficiency for the latter, that the advantage of one over the other is within the errors of sampling, analyzing and calculating.

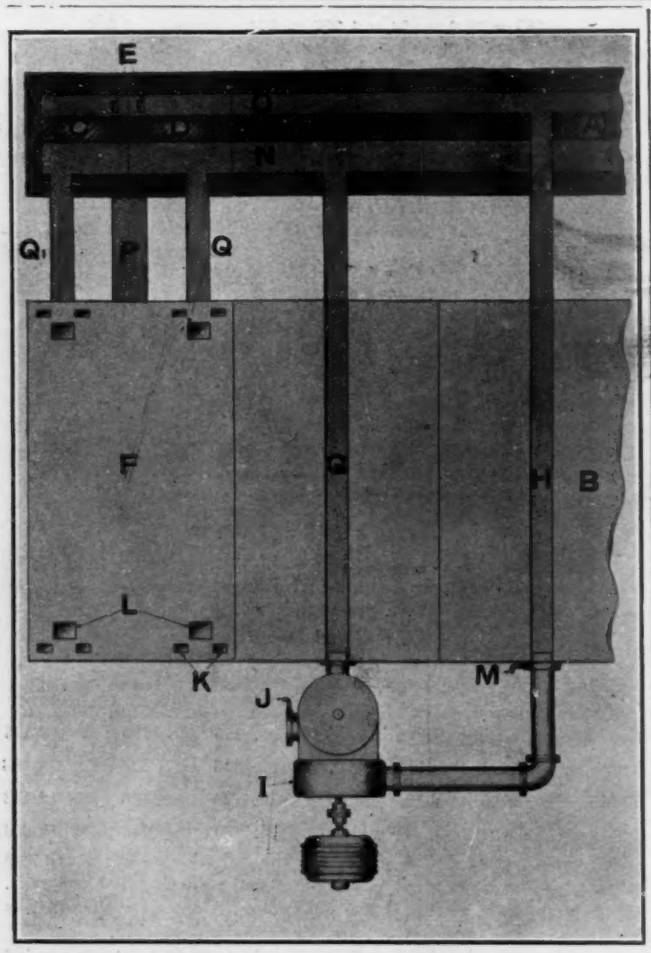
The fuel results for the month of March were 15.4 pounds per 100 pounds, or 25.8 pounds per 1,000 feet gas, and for April, 15.3 per 100 and 26.3 per 1,000 feet. This result is found by measuring the coke in 22 bushel buckets as it comes from the retort house and using 38 pounds per bushel.

Two men days and two men nights not only take care of the rear end retort lids and the feeding of the producers, but they attend to all the work on the producers of 7 benches, and as there is a twin producer for each bench, this means 14 fires, or 3½ fires per man. The total absence of clinker insures a uniform activity of each square foot of fuel on the grate area, and of each cubic foot of fuel in the producer. The above, together with positive regulations, fixed openings and constant speed of blower, make possible a uniform and constant amount of producer gas of a constant heating value, going forward to the combustion chamber at all times. The amount of heat not only remains constant, but the volume of gas also, and this is fully as important as the former.

In starting the benches, the usual precautions as followed: Drying thoroughly, getting the nostrils red hot before closing coaling holes, and keeping an excess of secondary air in the setting.

The producers are run without any waste gases until a temperature of about 1,200° is obtained, care being taken not to raise the temperature over 200° in 24 hours. At this stage, the blower is started and run at a constant speed by means of an induction motor, and a pressure of 1 inch is maintained in the return flue. Under these conditions the primary air opening will be about one-half what it was before the blower was started. This will give close to 10 per cent. CO_2 in the mixture entering the producers, which is a convenient point to regulate from.

Having started the flue gases with the primary air, the given mixture of O_2, N_2 and CO_2, provided the producers are kept full, will set up a certain temperature in the producers and will give a fixed amount of gas and heat travelling to the combustion chamber. To increase the temperature in the combustion chamber, the primary air and amount of mixture is increased until the requisite temperature is obtained. After getting the approximate temperature required, the amount of opening of the dampers regulating the mixture under the grate bars and the pressure in the return flue is adjusted to give the



A—Furnace stack. *B*—Retort stack *C & D*—Twin producers. *E*—Dampers from return flue to producers. *F*—Bench of 8 retorts. *G*—Flue from main flue to blower. *H*—Flue from blower to return flue. *I*—Blower. *J*—Primary air inlet. (On the inlet to blower.) *K*—Secondary air inlets. *L*—Slack dampers. *M*—Pressure regulating damper. *N*—Main flue to chimney. *O*—Return flue. *P*—Oxide flue. Q_1 & *Q*—Flues from bench to main flue.

requisite volume of producer gases and the desired per cent. of CO_2. Then the pressure in the settings must be adjusted by the individual stack dampers so as to obtain a slight pressure. We then adjust the secondary air dampers to give a slight excess of oxygen at the outlet of the bench proper. After the above changes are made the primary air may need some slight re-adjustment. We have found that with 7-hour charges of 900 pounds, using hot coke from the gas coal, that the following conditions are the most satisfactory: CO_2 in R. F. 8—9 per cent. Pressure in R. F. $\frac{7}{16}$ — $\frac{9}{16}$. Excess O_2. 1 per cent. Pressure in settings $\frac{1}{16}$ — $\frac{9}{16}$ ±.

Having obtained the proper regulation, and provided the producers are kept full, the temperature in the combustion chamber will not vary 60° F. from the normal.

The reason for this is as follows: The amount of oxygen entering the system is automatically controlled to within very narrow limits, and it follows that with a given amount of fuel in a uniform condition the amount of heat and volume of gases going to the combustion chamber is constant.

The manner in which the oxygen is controlled is as follows: The air enters at the inlet of the blower and through the secondary air ports. If the primary air at the blower increases, the amount of producer gas going to the setting increases, and as the stack openings will only take care of a given volume, the amount of secondary air is therefore decreased, and consequently, the surplus secondary air which goes with the waste gases back to the producers is decreased, and offsets the increased amount of primary air. This action is reversible. That is, if the primary air is decreased, the volume of producer gas decreases and more secondary air drawn in, and the surplus passes on to the producers with the waste gases.

The temperature in the retorts may vary 75°, due to the character of the coal and the size and weight of the charge, but with a constant temperature in the combustion chamber, and a constant volume of producer gases, if the coal size of charges are maintained within reasonable limits, the temperature in the retorts will be uniform throughout the same retort and the same in all the retorts, and they will not vary from day to day to any appreciable amount.

In closing I must ask that you excuse any deficiencies in this paper. It is made up from a mass of data, all of which is interesting, but only a small portion could be brought before you I hope the description of this retort house will induce you to visit it. I also hope the figures given from the experiments will be of interest and that you may strive to get even better results from the *pound of coal*.

The Chairman—I think it would be well if we asked Mr. Africa to now read his paper on Vertical Retorts, so these papers can be discussed together.

Mr. Africa then read his paper as follows:

REPORT ON VERTICAL RETORTS.

In 1908, two benches of vertical retorts, of the intermittent charging type, were completed at the Manchester (N. H.) Gas Works; each bench consisted of 9 retorts, 8 inches by 14 inches at the top and 12 inches by 18 inches at the bottom, 18 feet 6 inches long. An illustration and further description of these benches is given in a paper on Vertical Retorts by J. H. Taussig (American Gas Institute Proceedings, 1908, page 564). One of the benches was operated a number of months during the year and demonstrated that the furnace and recuperators were entirely satisfactory. The size of the retorts was in the nature of an experiment, as no vertical retorts of which we have any record had been tried heretofore with American coal.

The size of the retorts adopted was made small, in order to carbonize the coal in the shortest time possible and obtain through short charges a greater capacity per bench per 24 hours.

The small retorts did not prove to be entirely satisfactory with Run-of-Mine West Virginia coal, which was used during the tests. The charges were burned off in 6 hours but would not discharge without some poking both at the top and bottom of the retorts. Tests were made of screened coal of uniform sized lumps, which worked much more satisfactorily.

In order to determine the best size of retort to carbonize American coal, the nine small retorts were removed and replaced by five of different sizes and tapers, having a capacity varying from 1,000 pounds to 2,200 pounds of coal per charge. These experimental retorts have been under fire for several months and domonstrated that a retort 10 inches by 14 inches at the top and 15 inches by 21 inches at the bottom, 18 feet 6 inches long, gives the best results, discharging entirely satisfactorily in 9 hours, and in a large percentage of the trials discharged in 8 hours, indicating that if the benches were fitted with retorts of a uniform size and operated continuously and regularly, it would be conservative to figure on 3-hour charges.

The vertical retorts were under fire at the same time the horizontal benches were in operation and both gases handled by the same exhauster.

In order to determine exactly what results the verticals were giving, a 5-foot station meter was connected in such a manner that the gas from these retorts was pumped by a separate exhauster through this meter. This test was made during the latter part of June, 1909. A connection was made from this meter to the photometer room and a sample of the gas purified by oxide was passed through a 30-gallon mixing tank and from this tank to the bar photometer. A pentane lamp was used as a standard. For several days hourly readings of the photometer were made.

The analysis of the coal (West Virginia) used at Manchester is as follows:

Moisture	1 25 per cent.
Vol. comb.	39.30
Fixed carbon	53.85
Ash	5.60
	100.00
Sulphur	0.76
Cal. value	14,640 B. T. U.

Analysis of coke from 9-hour charge—

Moisture	0.10 per cent.
Vol. comb	2.40
Fixed carbon	89.20
Ash	8 30
	100.00
Sulphur	0.85
Cal. value	14,329 B. T. U.

The continuous hourly test gave the following results—

Yield per pound of coal	4.82 cubic feet.
Candle power (measured with a flat flame burner)	16.08
Candle feet per pound	77.51
Calorific power, B.T.U.	635.00

Carbonizing, 45 per cent. of capacity of setting.

Yield of coke and fuel used in furnaces was as follows—

Per cent. of coal carbonized used in furnace	23
Total coke made per cent. of coal carbonized	61

The tar obtained was thin and contained about 7 per cent. of free carbon. The coke is of a better quality than obtained from horizontal retorts and produces less breeze.

The cost of labor per 1,000 cubic feet will compare favorably with that of machine-stoked horizontals.

The plans are completed for refilling the two benches with retorts of the size described above, and when these are in operation a further report of the results will be made.

(To be Continued.)

[Official Report—Continued from Page 301.]

SECOND ANNUAL MEETING, INDIANA GAS ASSOCIATION.

Held in the Claypool Hotel, Indianapolis, Jan. 19-20, 1910.

First Day—Morning Session.

Discussion on the Dykeman Paper.

The President—The paper by Mr. Dykeman is open for discussion and I sincerely hope you will take a lively interest in the discussion. Mr. Dykeman mentioned the boosting of the pressure by the Sturtevant blower, worked by a 3-phase electric motor. We have one in use at Jeffersonville that works very satisfactorily, excepting when at one time the electric current failed and we were in bad shape. Unless you have your own electric plant, I would suggest that the blower had better be steam connected.

Mr. C. H. Graf—Mr. Dykeman has well said that it has been a saying that "dividends are earned in the retort house." That was undoubtedly true of the time when we were getting high prices for our gas, when there were no appliances in use, and when our distribution expense consisted of taking meter statements and attending to service and meter complaints. At present prices, however, it would be impossible to earn dividends were we restricted to the limited volume of sales that go with the times when dividends were earned in the retort house. In other words, the problem of to-day in our business is not so much the manufacture of our product as a disposal of the same at a profit. The introduction of domestic and industrial appliances has increased our sales enormously, and now our mains, instead of doing work only a few hours in the day, are actually supplying gas the greater part of the 24 hours throughout the year. Unfortunately this additional consumption does not take place entirely outside of the period which used to constitute our lighting load, and the lapping of the old and new loads brings about what we term "peak loads." To increase our main capacity so as to take care of peak loads with holder pressure, is prohibitive on account of cost. The natural solution seems to be to increase the capacity of our present mains by increasing the pressure. The system of high pressure feeder mains described by Mr. Dykeman is used quite generally and is the one adopted by our Company. We have in use about 7 miles of 8-inch and 10-inch pressure mains into which gas is pumped by compressors. The pressure in these mains will vary from 2 pounds to 15 pounds, according to the demand. The high pressure gas is delivered through governors to the low pressure mains at whatever pressure is required in the different districts. We have 11 recording gauges located throughout our territory and these charts are carefully examined daily. From the observation of these charts instructions are tabulated showing requirements of pressure for the 24 hours at outlet of holder and compressors. Our greatest peak loads are between 5 P.M. and 6:30 P.M. on week days and between 11:15 and 12:45 P.M. Sundays. A recent test shows that over 50 per cent. of the gas consumed during peak loads is supplied through the high pressure feeder mains. I understand that in some cities the gas is pumped directly into the low pressure mains by a booster. In the territory adjacent to the booster, when the pressure in the mains would be excessive, individual regulators are placed on each service. As the pressure is increased by reason of increased demand, the area in which regulators are installed is extended correspondingly. What the leakage is under this system I have not ascertained, but it is reasonable to assume that there would be some increase.

The President—Mr. Pickens, have you anything to say on this subject?

Mr. A. G. Pickens—I do not feel specially qualified to discuss this paper, as I have had very little experience. The situation at Evansville is this: They are depending a little too much on the personal equation of one or two men who are going to run these boosters. Wouldn't it be possible to rearrange their works to keep the pressure on the high pressure lines all the time? Then the pressure would be available any time it was needed. They have got to depend on telephones which may get out of order, and also to depend on this man at the works being on the job all the time to start and stop these boosters instead of keeping it going continually. It just occurred to me that that might be quite a serious proposition. Suppose some day they tell this man who operates this exhauster to report at 4 and it gets dark at 3, and they get hold of somebody who is not familiar with the valves and operations of this machine to start it up. In Mr. Dykeman's supplemental remarks, he said that when his electric moter broke down, he had a connection with his exhauster whereby he turned the exhauster into his high pressure mains. Did he turn the dirty gas into his mains?

Mr. J. H. Dykeman—I think Mr. Pickens was not here last year, and if he was, he perhaps has not allowed the information that we gave him last year to soak in, and for his information and that of others I will say that we have a high pressure and low pressure system combined, a high pressure system on which we have got 7,000 or 8,000 consumers, in operation by compressors, and this high pressure is connected into the low pressure system by a series of regulators to meet the peak load. These regulators are set at 36-tenths, and the compressor is speeded at the peak load so as to maintain the pressure on the low pressure spstem. In conjunction with this is this Sturtevant booster, which goes on at the peak load, and like all other things it is dependent on human labor, and if someone will devise a system that is thoroughly automatic, we will be very glad to have it, but such is not the case. We must depend on human labor, and in operating the Sturtevant fan we do depend on human labor. Not only on the labor of one man, but on that of several. It is absolutely necessary that we be in telephonic connection with the different stations. We have got this down to such a fine point that I can tell from my office what pressure we have got, providing the works do not send out naphthaline. If they have done so, of course, it shows it. But the peak load is simply dependent upon the booster, which is dependent upon a man, and the man, of course, is dependent upon me. The high pressure system is entirely separate and distinct, except so far as its connection with the low pressure system, into which it feeds when the peak load is required. For the water gas exhauster we have a separate connection and separate valves, by which we can disconnect or cut it off from the raw gas and use it as a booster. I do not think it hardly a fair thing for a person to say that we are throwing raw gas on the town. I do not think any man in this day and generation would do such a thing as that, if he wants to keep his business, anyway.

Mr. A. S. Cooke—There is one point about Mr. Dykeman's paper that I would like to have a little light on. He states that during the operation of the booster this holder outlet is shut off. That would look to me as though for the time being he transferred his ordinary distribution system into the high pressure system. That is hardly my conception of the booster principle. I have had the idea in my head that the operation of the booster is something to assist the ordinary distribution system. In Terre Haute we operate such a line. We have an extended high pressure main and during our hour of maximum consumption, or our period of maximum consumption, we operate a Sturtevant blower, and this main is tied in in a number of places selected by those familiar with the requirements, and we simply pump this gas in at a sufficient pressure to allow delivery into the distribution mains, maintaining a satisfactory pressure. Our holder, of course, having a regulator, in case the pressure, through a sudden drop in consumption, should tend to rise.

The President—At what maximum pressure do you work your blower? What is the horse power or motive power per 1,000 cubic feet of gas?

Mr. A. S. Cooke—We have not had sufficient experience to give you any data on that. It is a No. 5 Sturtevant blower and we are operating that with a 5-horse power steam engine. We have not had the experience with electric motors that you folks have. Our experience was with a gas engine, but we had to cut that out and put in a steam engine. But the blower in our system is not allowed to demonstrate its full efficiency, owing to the fact that the immediate delivery pipe

is only 3 inches, whereas it should be 8. We do not calculate to force all the gas through that the blower is capable of forcing, but our pipe is sufficient for our requirements. We are probably running 8,000 or 10,000 cubic feet an hour at the time of greatest demand.

Mr. James T. Lynn—Do I understand Mr. Dykeman to say they keep a man at the regulator every day to watch the pressure between his high and low pressure mains?

Mr. J. H. Dykeman—No; everything is there in the exhauster house, as you will recollect. The exhauster fan sets over near the Pennsylvania avenue side; as you come in the door the exhauster fan is on the left. There is only one man in attendance there and he comes on when we start the booster. When the peak load is on the regulators take care of themselves. They are out north and west, out Washington avenue way and in the southeast section. Those are tied in from the high pressure line to the low pressure line, taking the feed from the high pressure line into the regulator and delivering from the regulator into the low pressure line. The regulators are the Johnson regulators and are set at 36-tenths. When the pressure goes below that they commence to open, and at our peak loads we start up the compressor so as to maintain as near as possible the delivery into the low pressure mains from the regulator. We found in 5 miles of high pressure main, which circulates all up to the north and then east and then south of Kentucky avenue, that there was a drop in that end of it of about 7 pounds, starting in with about 12 pounds at the works. So we speeded up the compressor that takes care of the amount of delivery we want.

Mr. J. T. Lynn—Did you find the trouble with the Johnson regulator that the high pressure gets lower than the low pressure?

Mr. J. H. Dykeman—No, we never carry less than 5 pounds.

Mr. J. T. Lynn—Suppose on this occasion when you say your electric current gave out, that your booster should stop and the low pressure on your high pressure mains should become less than the pressure on the low pressure mains.

Mr. J. H. Dykeman—I don't think you quite grasp the situation. The high pressure is on the compressor.

Mr. J. T. Lynn—I understand. Suppose the compressor should stop an hour or 2 hours while the peak load was on?

Mr. J. H. Dykeman—We have two exhausters there to take the place of the compressor. We have one Westinghouse exhauster.

Mr. J. T. Lynn—I had that trouble with both the Johnson and Reynolds regulators. They do not start up again. We have got a high pressure system in several of our plants. In Rome, N. Y., we fitted up a system last fall, and we put in a Lloyd regulator made in Detroit, and we found no trouble at all in using that, say, for instance, on Sunday. Our evening hours, from 12 o'clock Saturday night to 10 o'clock Sunday morning, we do not need the booster system on our mains. We find no trouble in return of the gas on this regulator we use.

Mr. J. H. Dykeman—Our engineer has spoken to me about this Lloyd regulator, and has said that when we got ready to discontinue the Johnson regulators we ought to give this regulator a trial. We have never had that trouble come up at all.

Mr. J. T. Lynn—In a smaller plant that probably would not occur. I found I had to send a man out to start the regulators.

The President—Is there any gentlemen present who has had any experience in the line about which Mr. Lynn asks the question. Gentlemen, this subject of Mr. Dykeman's is open for discussion. We would be pleased to hear from you.

Mr. V. P. Wilkins—I have not exactly got this matter straight in my mind. As I understand, you have got two systems of assisting the regular distribution, a regular high pressure system and then sometimes you start a booster. Suppose your high pressure system was being used, would you use the booster with it?

Mr. J. H. Dykeman—I suppose that if we were in the same position and had the money that the Indianapolis and St. Louis people have, where they have the entire regulator system, we probably would not have to use the Sturtevant booster, but, as a solution for our difficulties that was adopted. Our first problem, 3 or 4 years ago, was to increase the capacity of our mains, and this was done by this high pressure belt system. Then the next problem was to increase the increase that was demanded and the booster went in as an increase on that, and that, for the time being, has served our purpose very admirably. What we will do in another 2 or 3 years is a different matter.

Mr. Wilkins—Does your line carry 36-tenths gas?

Mr. Dykeman—We carry 42-tenths.

Mr. Wilkins—Don't you think that possibly it would be better to take the money and put it into a smaller line that would carry high pressure gas?

Mr. Dykeman—That is a question for engineers to determine. Our engineer is the man responsible for that and we simply execute his ideas.

Mr. H. Rochat—Suppose your peak load happened to break down; what then?

Mr. Dykeman—The exhauster is not connected. If we have a break down, if our booster breaks down, if all else fails except our water gas exhauster, our connections are such that they are cut off entirely from the boxes and from the holder, and the connection is to the distributing holder, and from the holder to the exhauster, and from the exhauster to the distributing mains.

Mr. H. Rochat—How long does it take to make that change?

Mr. Dykeman—It took us just 3 minutes. Of course, our line dropped to the point of 25-tenths, but within 3 minutes we had it on again. The change was made instantly.

The President—Has any other gentleman a question to ask or a contribution to make?

Mr. B. H. Danforth—Is it possible to reduce the pressure after the peak load is off in the evening? I notice the pressure is quite high at that time.

Mr. Dykeman—We have not aimed to. Of course, up town our pressure runs up to 45-tenths. We try to maintain a 42-tenths pressure. Whether the demand is much or little the 42-tenths is on the mains and we have found that it works better that way. We have so many industrial concerns on that line, so many laundries and so many cigar manufactories, that we found it did not pay to interfere with the pressure at all; so we have maintained the 42-tenths at the holder pressure. This is the holder Mr. Lynn built.

Mr. R. Shacklette—All of us who have ever operated with old or inadequate distribution systems are agreed on the desirability of the high pressure feeder lines or boosting lines. In considering the expense and profits in operating such a plant there are two things I think we all want to remember, both in contemplating and installing and afterwards in operating it. I had occasion a few years ago to install a high pressure line at Adrian, Mich., which was put in primarily to take care of a gas engine installation in the extreme end of town, where the engine was drawing the pressure on the low mains down to about 10-tenths. We put in a 3-inch belt line and operated up to 25 or 50 pounds. We got a fairly small compressor, thinking that a very little bit of volume would maintain the loss in pressure. We found it would not do at all. In other words, if we maintained a reasonable pressure in our lines at all times we had the possibility of a very much larger volume than our sales would warrant. Now a great many of the high booster plants I have seen I think are carrying an excess of pressure and thereby carrying excess operating expenses. There are a number I know of who are now making tests to reduce the pressure on their booster on high pressure lines, and I have in mind one engineer now who insists on a governor that will operate on a tenth of a differential in order that he may run down his booster lines to that differential to avoid the extra pressure.

The President—You mention one engineer who had in mind the construction of a governor to operate on a one-tenth differential. Under those conditions what would be your maximum pressure?

Mr. R. Shacklette—I say I have in mind an engineer who will insist on doing that.

Mr. J. M. Ott—I would like to ask Mr. Dykeman a question. Mr. Dykeman, as I understand delivers the gas at 42-tenths pressure. Is that delivered in the burner at that pressure?

Mr. J. H. Dykeman—Yes, sir.

Mr. J. M. Ott—Do you use the mantle lamps?

Mr. J. H. Dykeman—We do, and I think we give the best service in southern Indiana. We have upward of 2,000 odd lamps, and except some factories who cannot maintain incandescent lamps on account of the jarring of the machinery all of our installations are incandescent lamps. The adjustment of our lamps is made at that pressure and consequently when the demand comes on, the adjustment suits our high pressure. For instance, if you have a varying pressure, and use the old idea of reducing your pressure during the day time and night time, why your mantle people go out and adjust your lamps during the day, and if they are adjusted at 25-tenths or 20-tenths, it certainly would not be adjusted at 42-tenths. So our solution was to maintain one equal and regular pressure at all times and all hours and have it uniform. The only problem that confronted me was the mantle maintenance. At the L. and N. station, where they are using a great many lights, we nearly let our business

get away by letting them attend to it themselves. They said to me, "We are installing arc lights and lighting the station by electric lights." I said to them, "Let us attend to the maintenence of your lights. It won't cost you a penny except for the amount of material that is used. We will do the adjusting and if anything goes wrong we will fix it," and consequently we have got the finest lighted station in southern Indiana.

Mr. J. M. Ott—Do you have much trouble with black mantles or mantles splitting with that pressure?

Mr. J. H. Dykeman—Not where the adjustment is proper. They were not wise to the adjustment at the L. & N. station. They thought all that was necessary was to put on a mantle and light it off and let it go. They won't do at all. They have got to be looked after and if a gas company wants to be successful they have got to make it a personal equation and look after them themselves.

Mr. D. A. Barnes—I would like to ask Mr. Dykeman if he considers 42 tenths pressure the exact pressure that ought to be carried on a system at all times.

Mr. J. H. Dykeman—I do not know what your conditions may be. I am speaking of Evansville. We find that pressure most efficient.

Mr. D. A. Barnes—It ought to be on every system, then; your system is no different from any other system.

Mr. J. H. Dykeman—I don't know about that. I know the conditions we have there.

Mr. D. A. Barnes—You use 42-tenths pressure and have efficiency. If that is so, we ought all to carry 42-tenths. I don't think Evansville has any different conditions from the majority of us. If Mr. Dykeman has found that 42-tenths is the best pressure to carry we should all maintain that and carry that pressure, make that our standard.

Mr. J. H. Dykeman—I think that is a matter of opinion. There may be some engineers who stick for 30-tenths, and find they will get efficiency for 30-tenths; but if your appliances are adjusted for 42 tenths it would be unwise to change that pressure because you get an idea that another pressure would be better. You would simply have an interminable job on your hands.

Mr. D. A. Barnes—As I understand you, you adjust it at 42-tenths to get the most efficiency.

Mr. J. H. Dykeman—Isn't it your opinion that in these days a reasonably high pressure is more efficient than an old-time low pressure?

Mr. D. A. Barnes—I am not asking that. I am asking if 42-tenths is what you think ought to be the exact pressure.

Mr. J. H. Dykeman—If Mr. Lynn had built that holder to only give us 35-tenths, then I would have thought 35-tenths was the pressure.

Mr. D. A. Barnes—Then would you be right?

Mr. J. H. Dykeman—Certainly I would.

Mr. Shacklette—I think Mr. Barnes' point is that the English burner manufacturers who are building for different pressures, at some I think an efficiency of 45 candles for a holder pressure, which means 45-tenths or 60-tenths as against 60 candles efficiency for those at 60 inches—I may be wrong in my candles, but the relative values are very close, so that the natural efficiency of gas distribution is going to be continually higher and higher. The conditions in Evansville call for 42-tenths, but you will possibly eventually come up to a higher pressure, 45-tenths or a little higher is quite common now.

Mr. O. O. Thwing—I just wanted to inquire of Mr. Dykeman what experience led him to believe in the efficiency of 42-tenths power?

The President—It seems to me the only advantage to be obtained by furnishing gas at 42-tenths pressure as against 20-tenths, would be the higher efficiency obtained in your burner, caused by the increase of pressure due to the added 22-tenths. Now it hardly seems to me that that is enough to justify any company in carrying the 42-tenths pressure.

Mr. A. S. Cooke—I am not going to tell you the pressure we have at Terre Haute. We do not experience any of the difficulties you refer to there. The gentleman who stated that your distribution system governs the situation entirely has practically got the key to the whole situation. In some cases if your distribution is large, your service is large, you carry a normal pressure and give efficient service; but if there is part of your system so small it is necessary to carry a higher pressure to give service. There is no question but what the higher pressure carried the more efficient the light you give to the mantle burners. That is demonstrated very easily. In fact if you observe in different places the character of the light given by the mantle burner you can come pretty close to the pressure being carried on your mains.

Mr. J. T. Lynn—I was called on to investigate a gas company by some city officials, and I found that in 3 years the gas used in the homes in the town had increased threefold, and on investigation I found that the initial pressure at the works and two stations that this company controlled was governed by regulators, and they have a high pressure boosting line; the regulators simply had valves and they set these valves at different sized openings and they were running as high as 21 and 22 inches of water pressure, and that was the cause of the increased gas business. Now any of you that want to jump the consumption, all you have to do is to jump the pressure. [Laughter.] I claim that 42-tenths is not an excessive initial pressure, but if you have 42-tenths initial pressure, as Mr. Dykeman says, you regulate it and in that immediate vicinity you may get 42 tenths and you may get it at that pressure over the entire town at certain hours, but at the peak load there will be places in your system where it will not show 30-tenths. Therefore, if you set your appliances at 42-tenths pressure at certain times on your peak load you are not getting the best results out of the appliances. I do not think Mr. Dykeman's 42-tenths need call for so much discussion, because if you want to make gas bills large, carry 42-tenths. I do not carry 42-tenths except in one plant I am interested in now and I have about 14. I endeavor to carry about 3 inches. I think the 3-inch pressure, the 35-tenths pressure, is sufficient to get good results from any plants you may want to install.

The President—If no other gentleman has anything to offer, Mr. Dykeman will close the discussion.

Mr. J. H. Dykeman—I think I have said all that is to be said on the subject. I am glad I stirred things up.

The President—The next on the programme is

MODERN SELLING METHODS,

by our worthy Secretary, Mr. Eves.

A good story was told in by-gone days of a village "organ blower" whose duty it was to pump wind into a church organ on Sundays and practice nights. He claimed to be quite as important in producing the music as the organist himself, and proved his contention by waggishly stopping the bellows in the middle of a consoling melody.

The commercial men in the gas industry might not have to stop bellowing to prove that the works could not well be made to go without the wind, or that there must have been a considerable amount of inflation work done.

The question before us now is not how the pipes have been filled in the past, but to what extent the tune and the meter can be enlivened when the old worn-out pumping handles are displaced and up-to-date gas is the power.

Modern selling methods have unquestionably supplanted older and less productive systems. Gas managers and salesmen have had the benefit of longer experience, combined with a steady expansion of the markets and a more pressing competition to meet. It would, indeed, be an anomaly if this wider experience, growth of opportunities and competition had not resulted in an advance of ideas or methods. There has, therefore, undoubtedly been general progress along the lines of developing plans for securing goodwill and an extended patronage. There is probably not a gas company operating to-day, whose more perfected system is not more thoroughly grounded than ever before on the only successful policy of the "square deal." The interests of the consumer are the modern gas company's first consideration. The early history of the sales department offers many evidences of evolution in this respect. The antiquated rush light of big promise and disappointment has long since been snuffed out of countenance. The far reaching importance of this fundamental policy being so self-evident and so universally recognized, it may be considered quite unnecessary to mention it now.

But we may advisedly say, that every gas company has been confronted, not so much with the absolute necessity and value of this square dealing policy, as with the difficulty of bringing the idea to bear successfully upon all its departments. And the mistake which was formerly made was in undervaluing the difficulty of making this recognized principle operative and in not looking upon it as requiring repeated and constant instructive effort. Everyone of us can recall the days when the most persistent endeavors were made to exhaust the talking points for the gas appliances to be marketed, and the secondary place given to teaching the first necessity for conservative statements. The exaggerated claims of the salesman had often the effect of placing distrust and discontent in the consumer at the

very outset of the client's connection with the company. The advantages of a studied courtesy and tact, when the service was being installed, were often overlooked. In later days more serious care has been exercised in instilling this theory not only in the salesmen, but in the minds of every individual in the company's employ. Conservative claims and courtesy, and a strict attention to the consumer's complaints or imaginary grievances, have been demanded as absolutely essential to the gas company's prosperity. Some single individual in the company's service may entirely counteract the most polite and strenuous work of the anxious salesman and nullify the best efforts of the manager. If the seed of discontent is sown it will surely show in the harvest.

The remedy that keeps out these destructive weeds has been found in the comparatively modern idea of educational and social meetings among the men and in the morning meetings, when the heads of the various departments are able to send the men out to their respective districts primed with reminders and encouraged to cater to the wishes of the consumers. Fortunate and indeed proportionately productive of business growth is the company that has the incalculable advantage of the support and co-operation of all its employees in the cultivation of this fertile field of polite and fair treatment toward consumers. One of our written instructions or hints to canvassers, reads as follows:

"One of the strongest incentives to the canvasser in his efforts to secure new customers is to remember always the increased comfort and happiness he is instrumental in bringing to the patrons' homes or business by the introduction of our modern product and appliances. There is some pleasure in doing business when it is felt that the company is not the only gainer by the transaction, but that the clients are also benefited in so many ways. The patrons will show unmistakable appreciation and satisfaction in being acquainted with the intelligent uses of gas. With this well-known fact uppermost in the canvasser's mind he will readily see the importance of dealing fairly and consistently with everyone, being extremely careful in every case not to mislead or misrepresent, nor to promise more than he is sure can be fulfilled. It is only by straightforward and careful statements that permanent goodwill result from the taking of an order. As time goes on it becomes more and more evident that the conscientious policy of fair and square dealing with the public on the part of the salesmen and gas company has done more than anything else toward establishing and deserving that confidence and trust which is the true basis of success in any business and more especially in our own."

To the solicitors, as well as to all connected in any way with the sales of gas appliances, actual demonstrations, occasionally repeated, showing the maximum gas consumption and time of operation, are valuable and indispensable. To cook a good dinner or luncheon before the men, whose attention is psychologically riveted on the expert manipulation of the gas range, is the time to prove by test meter and the clock the actual cost for gas used and the time occupied in cooking. To demonstrate facts is the best means of insuring a statement of facts. Enthusiasm for our gas appliances can be aroused and maintained by frequent instructions, and this enthusiasm, honestly employed, is bound to bring success. Not that solicitors should claim to be experts all along the line. They should, however, be equipped with serviceable and reliable information and a more detailed conception of the full value and the advantages of the gas appliances which they are expected to sell. This trains the ambitious salesmen, and through them the consumers, in the economies of manipulation, secures an intelligent use of the gas and opens the door to further orders.

It is well to care for the consumers by pointing out ways of saving gas. To advocate publicly the use, for example, of the double and triple saucepans, and many other gas-saving ideas and accessories, may seem at first like needless curtailment of consumption, but the information convinces the public of the gas company's sincerity in its desire to help the consumer to use gas properly and without injurious waste. The educational policy not only brings its reward in the form of gratitude and goodwill, but prevents the counteracting and expensive effects of discontent and complaints. The prevention of complaints is cheaper than cure. But this is not always recognized. The same watchful system applies to the use of all other appliances, and we repeat the claim, which all gas men must admit is logical, that it pays to even buy goodwill, for the double reason that the cost decreases the expense of the complaint departments, keeps good customers on the books and makes friends and advocates for the company.

There are still some gas companies that have not adopted the modern method of doing much of this educational and instructive work by means of the woman demonstrator or instructor. The reason often given for this omission is that it is a matter of difficulty to secure the services, at other than prohibitive cost, of a woman competent to carry on the work. The problem, we believe, has now been solved so far as the gas companies represented in the Indiana Gas Association are concerned. We propose to-day to submit a scheme, which is not an expensive one, and I believe there is no difficulty, as far as we can see, to be encountered. An offer is to be made to-day to all members of the Association whose companies wish to avail themselves of the opportunity to adopt one of the most successful methods known for the popularizing of appliances and for securing a satisfied and grateful patronage.

Indianapolis has experienced the value of this instructive and business building work and is fortunate in having an instructor thoroughly qualified for the duties. It has cost our Company considerable time and expense to bring the instructor up to her present practical standard of capability and success, but having now this competent official, with the required qualifications for the helpful work, and as many gas companies now recognize practical instruction as one of its most important policies, realizing also that other companies in this State not having an instructor will be glad to adopt this educational method, the present convention has been deemed an opportune time to suggest a plan that has been carefully thought out and considered feasible. The offer is now made by Mr. Carl H. Graf, through the writer, to this meeting, that, if the gas companies interested in this movement will select in their respective districts some woman who possesses in a small degree the qualifications of being able to do a little practical cooking, and to visit the homes of consumers, a course of training, including 15 lessons in practical cooking and gas appliance management will be conducted by our instructor, Mrs. Hawkins, in Indianapolis, extending over a period of 3 weeks. The women will be cared for at respectable homes in this city. Instructions will be given in the office of the Indianapolis Gas Company, in the afternoon or evening, where the necessary kitchen equipment will be furnished free of charge. A fee for each pupil for the complete course will be paid by the respective gas companies to the instructor, out of which she will meet all the necessary expenses of the course. One or two talks and a full list of typewritten instructions by the writer will form a part of the instruction work, this part of the programme being, of course, without charge. A minimum number of pupils will be decided upon and if a sufficient number of pupils are entered the course will begin as soon as arrangements can be made for it.

Many of the larger gas companies have reaped the benefits derived from the work of the demonstrator, but the less favored and smaller companies have longed, so far in vain, for a suitably trained woman to bring these good results. With such an official as the demonstrator or instructor it is surprising what results can be obtained from the systematic plan of educating consumers in a successful and full use of gas appliances, and no gas company's territory can be too small for this work. It has also been found equally surprising what this appreciative work has done in increasing the sale of appliances that help along the patron's domestic comfort and the gas consumption. One part of the work of our demonstrator during the past year has been to "talk up" the kitchen heater among the housewives who have purchased gas ranges, thus giving them an additional and acceptable convenience in the kitchen and bringing about the use of the gas range all winter.

The value of a demonstrator, however, does not end in this house-to-house work. The educator is available for soliciting work, to conduct cooking classes for mothers and grown-up girls in various parts gas company's territory, and to give courses of lessons in cookery at the public institutions. Successful selling methods include to a larger extent than is generally allowed, the nursing of popular sentiment and kindly feelings toward the gas company, and the spreading of this favorable sentiment must be accomplished by other than the stereotyped methods of advertisements and newspaper publicity. The support of a community can be deservedly gained by these little attentions and appreciations of the public. Cooking classes also create a deeper interest in the perennial lectures, which most gas companies are giving, by domestic science experts in the public halls. It is also fortunately our experience that to have the instructor in the office on the days when consumers pay their monthly bills is of immense benefit to the customers and the company. Patrons take advantage of the meeting days to ask questions and seek advice. They receive and look for each month "free recipes," which are alike helpful to the people and to the more general use of gas as fuel. Mrs. Helen Armstrong says:

"Women who are given practical instruction in an entertaining way spread the gospel for the gas company. The pose of public benefactor for the gas company is a new one, but it is vastly becoming. It is no exaggeration to say that not 20 per cent. of the women cooking with gas to-day know how to do this to the greatest advantage."

Twenty per cent. is a startling figure and goes to support the importance and good results we are attaching to this educational and comparatively inexpensive work.

The advantages of meeting at the office are also utilized by the solicitors, who, by appointing a date to meet prospective clients in the appliance salesroom, when it is their turn to be there on busy days, multiply their chances of making sales and of introducing the tempting array of household or business aids to "comfort, convenience and economy."

Contests among the salesmen have created a spirit of emulation, bringing out the best qualities and most productive work. If ouly two canvassers are employed in a district they should be placed in competition with each other for some reward over and above their pay. Even where only one man is sufficient to cover a small territory some inducement or prize should be awarded for superior results. Not that a salesman should be led to imagine that honest work should be bought, but that ambition and success are sure to bring some reward to himself. The negative value of the contests is enabling the gas company to adopt a minimum schedule or "low water line," below which a salesman cannot go without risk of losing his employment, and few men can be found in a prize contest who care to exhibit their names at the foot of the list. This more modern plan is, from our experience, far more profitable than the older system of payment by commission.

In connection with new business methods we are asked to explain in a few words the card system operated in Indianapolis. At the outset it should be clearly understood that, however advantageous such a system may be, its compilation requires prompt and thorough work and some preliminary expense. When the necessary cards and circulars, in 3 colors, had been printed, we began by employing the services of a number of reliable men to visit every building along the lines of the gas mains. This comprehensive enumerating work was crowded into as short a period as possible so as to avoid duplication caused by constant migration. The information secured showed, in addition to the names and location, just what appliances were in use. This information was used as the basis for determining the appliances that could be advantageously offered on subsequent visits. The cards were then classified and filed according to the condition of each case. the object of this filing arrangement is to afford a ready means of advancing any card after new business has been secured. Postings are made by the filing clerk from the daily reports. This card file will be further explained if necessary to any member of the Association desiring to adopt the system.

One important feature which is often overlooked is the willingness on the part of gas consumers, including merchants and others who have adopted gas appliances for lighting, cooking, fuel, etc., to furnish a testimonial as to the efficiency and economy of gas and to have photographs taken of their kitchens, or places of business, for advertising purposes. This willingness, especially among business men, has been partly attributed to a selfish realization of the opportunity to gratuitously advertise themselves, or their business, by means of the publicity given to the testimonials and the picture. Be this as it may, the favorable testimonial and recommendation count just as a means of influencing and securing new customers for the gas company. In one booklet issued by our company 14 of these illustrations and commendatory letters were published and in another booklet, 17 such testimonials were inserted.

This collection of testimonials has revealed another phase of the question not so generally noticed, and that is the remarkable saving that may result from the adoption of gas in some cases. It is a safe rule in estimating the difference in cost between one system and another, say gas as against electricity, to figure on the lowest rate of the competing method. This, as a principle, is probably a good plan to follow. But we are apt to overlook the larger saving and economy that rewards the convert who has been paying exorbitant rates for the abandoned method. The following testimonial will show this point very clearly. The proprietor of an Indianapolis hotel writes:

"I find that with the installation of four Welsbach gas arc lights in our lobby we have reduced our lighting expense for this space at least 75 per cent. Prior to this installation incandescent lamps were used, current being furnished at a fair rate."

In advertising favorable comments from consumers it has been considered business-bringing to have the seller's story presented, as it were, by someone other than the seller. "What they say" has always been a winning caption in productive publicity. Prizes to women for letters to be used in this form of advertising have been one of the best means of securing business-building copy.

In the industrial department we have gone to considerable trouble and expense in order to show, under the head of the various industries, gas fuel appliances that can be advantageously adopted. These lists have been subdivided into three booklets, of different colors, and distributed according to class among the various industries of this city. If any member of the Indiana Gas Association would like copies of these exhaustive lists, a sample of each list is offered to-day free of charge, so as to help along this branch of the industry in our State.

(To be Continued.)

Bureau of Information, The American Gas Institute.

Under the direction of the Institute it has been decreed: 1. That the privilege of submitting questions be limited to members of the Institute. 2. Neither the Board of Directors of this Institute, nor the Institute as a body, make themselves in any way responsible for the statements of fact or expressions of view given out by the Bureau of Information.

BUREAU OF INFORMATION, THE AMERICAN GAS INSTITUTE,
HEADQUARTERS, GAS OFFICE BUILDING,
V. F. DEWEY, Chairman. DETROIT, MICH., Feb. 11, 1910.

QUESTION NO. 60 AND ANSWER TO SAME.

Question No. 60.—What simple and efficient benzol vaporizer is there on the market capable of enriching 100,000 cubic feet of ordinary coal gas per hour 2 candles?

Answer.—So far as we know there is at the prssent time no manufacterer of gas works apparatus who advertises benzol vaporizers. By making use of the sketch shown on page 118, Proceedings of American Gas Institute, 1909, any shop can easily make the apparatus required. The paragraph describing this apparatus states that approximately 4 gallons of benzol per hour can be vaporized per square foot of heating surface. To enrich 100,000 cubic feet of gas 2 candles would require from 7 to 10 gallons of benzol per hour. Three feet of heating surface in the vaporizer would, therefore, be ample to do the work.

WARREN S. BLAUVELT,
Solvay Process Co., Detroit.

QUESTION NO. 64 AND ANSWER TO SAME.

Question No. 64.—"What book would be of most use to a man who is beginning the study of the manufacture of gas?"

Answer.—"Catechism of Central Station Gas Engineering in the United States." Published by the Trustees Gas Educational Fund, 58 William street, New York city.

The following questions have been submitted to the Bureau:

Question No. 63.—(a) Has there been any litigation against the erection of gasholders. If so, cite cases and nature of cases.

(b) Are there any statistics on explosions of gasholders?

(c) Has a gasholder ever been struck by lightning such as to seriously damage same and cause an explosion?

(d) Is there an authenticated compilation of the number of gasholders in use in the United States? How long have they been used and how many have exploded, if any?

Meeting Times of the Various Gas Associations.

American Gas Institute.—Annual meeting, October, 1910. Atlantic City, N. J. Officers: President, Wm. H. Bradley, N. Y., City; Secretary, A. B. Beadle, 29 West 39th street, N. Y. City.

Canadian Gas Association.—Annual meeting, June, 1910. Hamilton, Ont Officers: President, J. S. Norris, Montreal, P. Q.; Secretary and Treasurer, A. W. Moore Woodstock, Ont.

Empire State Gas and Electric Association.—Annual meeting, Nov., 1910. New York City. Officers: President, C. R. Huntley, Buffalo, N, Y.; Secretary, C. H. B. Chapin, 29 W. 39th street. New York City.

Guild of Gas Managers of New England.—Annual meeting, December. Young's Hotel, Boston; monthly meeting, second Saturday. Officers: President, A. K. Quinn; Newport, R. I.; Secretary, Walter G. Africa, Manchester, N. H.

Illinois Gas Association.—Annual meeting, time, March 18, 1910, Chicago, Ills. Officers: President, E. G. Schmidt, Springfield, Ills.; Secretary-Treasurer, C. B. Strohn, Elgin, Ills.

Illuminating Engineering Society.—Annual meeting, January —, 1911. Meetings of Sections, monthly. President, W. H. Gartley, Philadelphia, Pa.; Secretary, Preston S. Millar, 29 W. 39th street, N. Y. City. Sections: New York: Secretary, Albert J. Marshall, 227 Fulton street. New England, Secretary, L. D. Gibbs 39 Boylston street, Boston, Mass. Philadelphia, Secretary, F. N. Morton, Broad and Arch streets Chicago, Secretary, T. R. Beebe, 157 Michigan avenue,

Indiana Gas Association.—Annual meeting, January 19, 1911, Fort Wayne, Ind. Officers: President, Carl H. Graf, Indianapolis; Vice-President, S. E. Mulholland; Secretary-Treasurer, Philmer Eves, Indianapolis Gas Company, Indianapolis, Ind.

Iowa District Gas Association.—Annual meeting, time, June 23, 24, 25, 1910, Sioux City, Ia. Officers: President, Geo. H. Waring, Omaha, Neb.; Secretary and Treasurer, G. I Vincent, Des Moines, Ia.

Kansas Gas, Water and Electric Light Association.—Annual meeting, time, ——— ——— Wichita, Kas. Officers: President, W. A. Scothorn, Hutchinson, Kas.; Secretary and Treasurer, J. D. Nicholson, Newton, Kas.

Michigan Gas Association—Annual meeting, time, September, 1910; ——— ——— Officers: President, B. O. Tippy, Grand Rapids, Mich.; Secretary-Treasurer, Glenn R. Chamberlain, Grand Rapids, Mich.

Missouri Electric Light, Gas, Water Works and Street Railway Association.—Annual meeting, April 14, 15 and 16, 1910; Jefferson City, Mo. Officers: President, W. A. Bixby; Secretary and Treasurer, C. L. Clary, Sikeston, Mo.

National Commercial Gas Association.—Annual meeting, third week in October, 1910: Boston. Officers: President, E. N. Wrightington, Boston; Secretary, Louis Stotz, 36 West 39th street, New York City.

Natural Gas Association.—Annual meeting, May 17, 18 and 19, 1910; Oklahoma City, Okla. Officers: President, William H. McKenzie, Kansas City, Kas.; Secretary, T. C. Jones, Delaware, O. Editor Wrinkle Department, F. W. Stone, Ashtabula, O.

New England Gas Association.—Annual meeting, third Wednesday in February; Boston. Officers: President, Walter G. Africa, Manchester, N. H.: Secretary-Treasurer, N. W. Gifford, East Boston, Mass.

Oklahoma Electric Light, Railway and Gas Association.—Annual meeting, May 18, 19 and 20, 1910; Oklahoma City. Officers: President, F. H. Tidman, Oklahoma City, Okla.; Secretary-Treasurer, Galen Crow, Guthrie, Okla.

Pacific Coast Gas Association.—Annual meeting, Sept. 20, 21 and 22, 1910, Los Angeles, Cal. Officers: President, W. B. Cline, Los Angeles, Cal.; Secretary-Treasurer, John A. Britton, 925 Franklin street, San Francisco, Cal.

Pennsylvania Gas Association.—Annual meeting, April 13, 1910, Easton, Pa. Officers: President, E. G. Holzer, Easton, Pa.: Secretary-Treasurer, William H. Merritt, Lebanon, Pa.

Society of Gas Lighting.—Annual meeting, December, 1910; monthly meeting, second Thursday. Place, New York City. Officers: President, Fred. S. Benson; Secretary, George G. Ramsdell, 1123 Broadway, New York.

Southern Gas Association.—Annual meeting, Feb. 16, 1910, Chattanooga, Tenn. Officers: President, R. C. Congdon, Atlanta, Ga.; Secretary-Treasurer, James Ferrier, Rome, Ga.

Southwestern Electrical and Gas Association.—Annual meeting. ——— ———, 1910, Beaumont, Tex. Officers: President, R. B. Stichter, Dallas, Tex.; Secretary's office, 300 Commerce street, Dallas, Tex.

Wisconsin Gas Association.—Annual meeting, May 11 and 12, 1910, Milwaukee, Wis. Officers: President, R. B. Brown, Milwaukee, Wis.; Secretary-Treasurer, H. H. Hyde, Racine, Wis.

Items of Interest
FROM VARIOUS LOCALITIES.

MR. JAMES W. DUNBAR will be a busy man for some time to come, as an entirely new condensing and ammonia concentrator system is being installed at New Albany, Ind., and a 250,000 cubic foot 2-lift holder and two 12-foot circular, steel purifiers at Jeffersonville, Ind. The Western Gas Construction Company are doing the work.

THE effect of the excellent new business campaign, which is being so successfully handled by Mr. John C. D. Clark, of the Peoples Gas Company, of Chicago, Ills., is shown in the annual report of that Company. The financial statement for the year ended December 31 includes the following figures:

	1909.	1908.	190[illegible].
Gross.....	$14,561,588	$13,738,970	$13,146,367
Net	6,956,992	5,516,345	5,172,741
Balance.....	4,147,692	3,632,045	3,362,191
Depreciation.	1,034,588	876,351	843,409
Surplus	3,113,104	2,755,694	2,518,582
Dividends....	2,332,026	1,978,146	1,978,146
Surplus.....	781,068	777,548	540,636

President Knapp further states that the gross earnings are the largest for any year of the Company's history. Plant was substantially increased, mileage of mains increasing to 2,484 miles, a gain of 117 miles. The work done in the past 2 years, intended to regulate the distribution and pressure of gas, is showing good results, although it is perhaps too early to determine the full effect of the work done in this behalf during the year 1909, or what additional work or changes may be necessary to secure the best results. The increase in number of meters in use was 27,531, and in gas stoves 24,718, and in number of arc lamps 9,312.

THE Bridgeton (N. J.) Gas Company, largely through the efforts of Mr. B. F. Harding, will require a much enlarged storage capacity. The sales for January showed an increase of 12 per cent. over the same month of a year ago. The present holder, which has some 55,000 cubic feet capacity, is to be doubled in size by the addition of a lift. The work to be done by the Cruse-Kemper Company, who made the original installation some years ago.

THE annual meeting of the stockholders of the New Britain (Conn. Gas Light Company was held recently in the Company's office in the City Hall. The following Directors were elected: A. J. Sloper, of this city, H. E. Russell, of New London, E. N. Stanley, John Walsh, of this city, F. H. Travis, of Norwich, and Harold T. Sloper. All the Directors are the same as before, with the exception that Harold T. Sloper, the Secretary, has been added.

VISITORS to Easthampton, Mass., will find the Gas Company installed in their handsome new offices.

THE New York and Cleveland Gas Coal Company has arranged to open its new tract at Delmont, in Westmoreland county, which consists of 2,000 acres and will be developed in most modern manner. The building of the Company houses already is under way and more than 1,000 men are to be employed.

OMAHA, NEB., is destined to have some of the best paved boulevards in the country, as the gas company is about ready to supply the necessary tar and will assist the city officials in its use.

AMERICAN EXPOSITION, Berlin, June, July and August, 1910. According to the prospectus which has been issued, this is to be the first All-American Exposition ever held in a foreign country, and as it is not to include scenic railways or merry go-rounds, it should bring many visitors of the kind our manufacturers desire to reach. In 1908 Germany consumed some 275 million dollars worth of American goods, so that there is some business there already. The American headquarters of the Exposition are at 50 Church street, New York City.

THE stockholders of the Louisville (Ky.) Lighting Company, ratified on the 3d inst. an issue of $1,150,000 seven per cent. cumulative preferred stock, and $1,000,000 six per cent. 30-year convertible bonds. They also approved a contract with the Central Trust Company, of New York, providing for the sale of the stock and convertible bonds, and also certain first mortgage bonds.

THE annual report of the Portland (Me.) Gas Light Company shows that the effective work being done by Messrs. Dow and Yorke is bearing fruit, for the year 1909 closed with a gain of nearly 500 consumers, an increase in output of nearly 5 per cent., and complaints so few that it would hardly pay to count them. The following Directors and Officers were re-elected: William H. Moulton, Fred. N. Dow. Elias Thomas, Herbert Payson, W. W. Thomas, Dr. Charles M. Leighton. President, Fred. N. Dow; Vice-President, William H. Moulton; Engineer and Superintendent, Eugene H. Yorke; Treasurer and Clerk, Burton Smart.

IN accordance with the request of the Supervisors the financial operations of the San Francisco (Cal.) Gas and Electric Company for the year 1909 are reported as follows: The Company had receipts of $2,836,571.31 from the sale of gas, the cost of production of which was $2,434,488.65. For electricity the Company received $2,546,864.56 and the cost was $2,011,041.99. After paying $507,135.84 for bond interest and sinking fund, there was a net profit of $164,237.22. The value of the gas and electric plants is given at $28,372,904.85. The Metropolitan Light and Power Company had gas sales of $365,107.20. The value of the plant is estimated at $6,832,389. The Mutual Electric Company shows receipts of $208,736.01 and operating expenses of $183,030.89. The value of the plant is $1,246,604.83.

THE Milwaukee (Wis.) Gas Light Company has paid to the city $156,051.79 on account of taxes, and to their employees the regular semi-annual 10 per cent. bonus on wages.

THE Haverhill (Mass.) Gas Company has made a formal offer to the City Council to reduce the price of gas from $1 to 90 cents at once, and also agrees to make a further reduction to 85 cents when the consumption reaches 325 million cubic feet. The last offer to hold after a period of 5 years, whether the consumption reaches that total or not. In view of the above, probably no action toward municipal ownership will be taken.

THE Kalamazoo (Mich.) Gas Company has offered the City Council the sum of $100,000, to be paid in installments, for the proposed 30-year renewal of their franchise.

THE ground-hog adage apparently has no terrors for the Gas and Electric Reserves of Baltimore, Md., for they are open for engagements to "play ball."

PUBLICITY of the right sort is being carried on at Calumet and Laurium, Mich. One of a series of lectures by prominent men of Calumet, before the local Y. M. C. A., included a visit to the works of the Gas Company under the guidance of the Superintendent, Mr. C. C. Sloane.

CALENDARS of the kind issued by Mr. P. L. Rider, manufacturer of the Barnum respirator, are always welcome; ours is in use.

THE lectures on cooking being given by Lowell (Mass.) Gas Light Company, by Miss Webber, continue to draw good sized audiences and will be a feature in that city for some time.

THE Laconia (N. H.) Gas and Electric Company has been acquired by Messrs. Wallace L. Mason, George M. Rossman and Allen Hollis, of Concord, N. H.

THE Central Foundry Company, a New Jersey corporation, having offices at 37 Wall street, and controlling about 95 per cent. of the output of cast iron soil pipe in the United States, went into involuntary bankruptcy on the 11th inst. The Company has an authorized capitalization of $14,000,000, most of which is outstanding. The petitioning creditors are Gerry & Murray, the Vinton Colliery Company and Albert W. Secor, whose claims are $1,200. United States Judge Hough appointed Waddill Catchings receiver. Mr. Catchings helped to reorganize the firm of Milliken Bros., structural steel manufacturers and contractors in steel construction. August Heckscher, President of the Central Foundry Company, was one of the three receivers for the Millikens.

THE Denver (Col.) Gas and Electric Company's returns for the 12 months ended Dec. 31, 1909, shows that that year was by far the best in the Company's history, which has always been one of steady growth and expansion. The net earnings of $668,543 showed an increase of $82,917 over the 12 months ended Dec. 31, 1908, and were obtained after an increase in operating expenses of $119,884, and in interest and taxes of $113,884.

THE St. Paul (Minn.) Gas Light Company has filed its annual statement, which is the basis of the 5 per cent. gross earnings tax imposed by the city. It shows cost of plant up to December 31, 1909, $7,736,072.32. Bonds have been issued to the value of $5,000,000. Its total obligations are $5,838,799. The Company has an authorized capital of $2,500,000. Its assets are $8,338,799. Gross earnings from gas for the year were $944,039; electricity, $616,696; heating, $17,024; sale of residuals, $29,872; total gross earnings from all sources, $1,607,675.78. The tax to be paid will be $80,383.79. Its expenses during the year were $1,438,181; net earnings, $169,495. The Company employs 466 persons. It furnishes gas to 25,839 persons and electricity to 4,269. Steam is furnished to 14. The rate for gas is $1 net per 1,000 feet. Electricity is furnished at a graduated schedule, the basing rate being 13.5 cents per kilowatt hour.

AT the annual meeting of the Sodus (N. Y.) Gas and Electric Light Company, on the 8th inst., the following Directors were elected: William Wilson Nichols, of Rochester; Dr. Albert E. Larkin, of Syracuse; Thomas Hill Munro, of Camillus; Charles Warner Mills and George Raymond Mills, of Sodus. The officers were elected as follows: President, C. W. Mills; Vice-President, T. H. Munro; Secretary and General Manager, G. R. Mills; Treasurer, Dr. A. E. Larkin.

THE Blackstone Valley (Mass.) Gas and Electric Company has declared its regular quarterly dividend of $1.50 on its preferred stock, to be paid on March 1st to holders of record on the 14th inst.

THE Labelle Gas Regulator Company, of Lowell, Mass., has been incorporated to manufacture gas appliances, with a capital of $100,000. The officers are as follows: President, A. J. Gagnon; Treasurer, F. N. Labelle, Lowell.

THE Western United Gas and Electric Company purchased at public sale on the 5th inst. the Wheaton municipal light and power plant, the consideration being $27,250.

THE annual meeting of the Quincy (Ills.) Gas, Electric and Heating Company was held on the 8th inst. All of the former officers were re-elected. R. L. Stevens is President, J. T. Lynn, Managing Director, and M. G. Borgman, Secretary and Treasurer.

THE Utica (N. Y.) Gas and Electric Company were recently successful in a stolen gas case, to the extent of having the culprit fined $10 in addition to being reimbursed for the amount due for the gas stolen. Treatment of this kind will go a long way toward putting a stop to such practices.

AT the Montreal (Canada) Light, Heat and Power Company, engineer Mr. Howard E. Mann will have a new office building, and the Gas Machinery Company, of Cleveland, O., has built and erected a 60 inch ammonia concentrator for the recovery of the fixed as well as the volatile ammonia. Further improvements contemplated include a valve house, retort house and coal gas apparatus.

PUBLIC LIGHTING TABLES FOR FEBRUARY, 1910.

These tables are those used for computing the various times during the year, for New York and vicinity, when public lamps of all sorts are to be lighted and extinguished. As will be seen they include the all night and every night practice, and the moontable schedule as well. They were compiled by the American Meter Company, New York city.

Table No. 1.
FOLLOWING THE MOON.

Day of Week.	Date.	Light.	Extinguish.
		P.M.	
Tue.	1	5.50 L.Q.	1.30 A.M.
Wed.	2	5.50	2.30
Thu.	3	5.50	3.30
Fri.	4	5.50	4.40
Sat.	5	5.50	5.40
Sun.	6	6.00	6.00
Mon.	7	6.00	6.00
Tue.	8	6.00	6.00
Wed.	9	6.00 N.M.	6.00
Thu.	10	6.00	6.00
Fri.	11	6.00	6.00
Sat.	12	6.00	6.00
Sun.	13	6.00	5.50
Mon.	14	10.10	5.50
Tue.	15	11.30 F.Q.	5.50
		A.M.	
Wed.	16	12.40 F.Q.	5.50
Thu.	17	1.50	5.50
Fri.	18	2.50	5.50
Sat.	19	3.50	5.50
Sun.	20	4.40	5.50
Mon.	21	5.20	5.50
Tue.	22	No L.	No L.
Wed.	23	No L. F.M.	No L.
Thu.	24	No L.	No L.
Fri.	25	6.20 P.M.	8.20 P.M.
Sat.	26	6.20	9.20
Sun.	27	6.20	10.20
Mon.	28	6.20	11.20

TOTAL HOURS DURING 1910.

	Hrs. Min.
January	229.00
February	188.20
March	184.10
April	161.40
May	152.00
June	136.50
July	146.20
August	165.50
September.	181.30
October	217.10
November.	224.50
December	249.30
Total, year	2237.10

Table No. 2.
NEW YORK CITY.
ALL NIGHT LIGHTING.

Day of Week.	Date.	Complete Lighting in 1 Hour.	Complete Extinguishing in 50 Minutes.
		From Time Given.	
		P.M.	A.M.
Tue.	1	4.47	6.07
Wed.	2	4.47	6.07
Thu.	3	4.47	6.07
Fri.	4	4.47	6.07
Sat.	5	4.57	6.02
Sun.	6	4.57	6.02
Mon.	7	4.57	6.02
Tue.	8	4.57	6.02
Wed.	9	4.57	6.02
Thu.	10	4.57	6.02
Fri.	11	4.57	6.02
Sat.	12	5.07	5.57
Sun.	13	5.07	5.57
Mon.	14	5.07	5.57
Tue.	15	5.07	5.57
Wed.	16	5.07	6.52
Thu.	17	5.07	5.52
Fri.	18	5.07	5.52
Sat.	19	5.17	5.47
Sun.	20	5.17	5.47
Mon.	21	5.17	5.47
Tue.	22	5.17	5.47
Wed.	23	5.17	5.42
Thu.	24	5.17	5.42
Fri.	25	5.17	5.42
Sat.	26	5.22	5.32
Sun.	27	5.22	5.32
Mon.	28	5.22	5.32

TOTAL HOURS DURING 1910.

	Hrs. Min.
January	428.30
February	358.15
March	353.10
April	298.10
May	263.20
June	234.45
July	248.30
August	278.00
September.	311.25
October	370.05
November.	397.40
December	438.35
	3980.25
Deduct on account of 50 minutes extinguishing time....	30.25
Total, year	3950.00

The Market for Gas Securities.

While the past week has seen considerable activity in gas shares the net changes are comparatively slight, with the exception of Brooklyn Union, which reached 162 and closed at 158. All show a most favorable upward trend.

The most important financial announcement was the stock dividend declared by the U. G. I. Co. of 10 per cent., the face value of which is $1,500,000 and the market value $9,000,000.

Gas Stocks.

Quotations by George W. Close, Broker and Dealer in Gas Stocks.

16 WALL STREET, NEW YORK CITY.

FEBRUARY 21.

☞ All communications will receive particular attention.

☞ The following quotations are based on the par value of $100 per share:

N. Y. City Companies.	*Capital.*	*Par.*	*Bid.*	*Asked*
Consolidated Gas Co.	$78,177,000	100	145⅛	146
Central Union Gas Co. —				
1st 5's, due 1972, J. & J.	3,000,000	1,000	98	101
Equitable Gas Light Co.—				
Con. 5's, due 1932, M. & S.	1,000,000	1,000	—	105
Mutual Gas Co.	2,500,000	100	155	165
New Amsterdam Gas Co.—				
1st Con. 5's, due 1948, J. & J.	11,000,000	1,000	100	101½
New York & Richmond Gas				
Co. (Staten Island)	1,500,000	100	37	43
1st Mtg. Gold Bds. 5 p. ct.	1,000,000	—	100	101
New York and East River—				
1st 5's, due 1944, J. & J.	3,500,000	1,000	104	107
Con. 5's, due 1945, J. & J.	1,500,000	—	97	101
Northern Union—				
1st 5's, due 1927, J. & J.	1,250,000	1,000	94	100
Standard	5,000,000	100	—	75
Preferred	5,000,000	100	70	100
1st Mtg. 5's, due 1930, M. & N.	1,500,000	1,000	100	105
The Brooklyn Union	15,000,000	1,000	158	160
1st Con. 5's, due 1948, M. & N.	15,000,000	—	95	99
Yonkers	299,650	500	130	—
Out-of-Town Companies.				
Bay State	50,000,000	50	5/8	11-16
" Income Bonds	2,000,000	1,000	—	75
Binghampton Gas Works	450,000	100	—	65
" 1st Mtg. 5's	509,000	1,000	90	96
Boston United Gas Co.—				
1st Series S. F. Trust	7,000,000	1,000	82	85
2d " " "	3,000,000	1,000	47½	50
Buffalo City Gas Co.	5,500,000	100	5	8
Bonds, 5's	5,250,000	1,000	73	73½
Capital, Sacramento	500,000	50	—	35
Bonds (6's)	150,000	1,000	—	—
Chicago Gas Co. Guaranteed				
Gold Bonds	7,000,000	1,000	104	106¼
Cincinnati Gas and Electric				
Co.	29,500,000	100	92	93
Columbus (O.) Gas Co., 1st				
Mortgage Bonds	1,500,000	1,000	96	98
Columbus (O.) Gas Lt. &				
Heating Co.	1,982,750	100	90½	91
Preferred	3,036,500	100	75¼	80
Consumers, Toronto	2,000,000	50	200	204
Consolidated, Baltimore	11,000,000	100	—	105
Mortgages, 6's	3,000,000	—	—	118
Chesapeake, 1st 6's	1,000,000	—	—	—
Equitable, 1st 6's	910,000	—	—	—
Consolidated, 1st 5's	1,490,000	—	—	112
Consolidated Gas Co. of N. J.	1,000,000	100	15	17
Con. Mtg. 5's	880,000	1,000	92	95
Bonds	75,000	—	—	100
Denver Gas and Electric	458,000	—	102	105
Detroit City Gas Co	5,000,000	50	—	50
" Prior Lien 5's	4,619,000	1,000	97	100¼
Detroit Gas Co., 5's	381,000	1,000	75	80
Equitable Gas & Fuel Co.,				
Chicago, Bonds	2,000,000	1,000	—	101
Essex and Hudson Gas Co.	6,500,000	—	39	40
Fort Wayne	2,000,000	—	—	—
" Bonds	2,000,000	—	55	—
Grand Rapids Gas Light Co.,				
1st Mtg. 5's	1,225,000	1,000	104½	105
Hartford	750,000	25	190	200
Hudson County Gas Co., of				
New Jersey	10,500,000	—	112	113½
" Bonds, 5's	10,500,000	—	102	102½
Indianapolis	2,000,000	—	60	70
" Bonds, 5's	2,650,000	—	104½	105
Jackson Gas Co.	250,000	50	82	—
" 1st Mtg. 5's	290,000	1,000	97	100
Kansas City Gas Light Co., of Missouri	5,000,000	100	—	36
Bonds, 1st 5's	3,822,000	1,000	102	104
Laclede Gas Co., St. Louis	10,000,000	100	106	106½
Preferred	2,500,000	100	—	98
Bonds	10,000,000	1,000	104	—
Lafayette Gas Co., Ind.	1,000,000	100	—	60
Bonds	1,000,000	1,000	60	65
Louisville	2,570,000	50	143	145
Madison Gas and Electric Co.				
" 1st Mtg. 6's	350,000	1,000	106	108¾
" 6 per cent. scrip, due 1910	100,000	25	60	60½
Massachusetts Gas Companies, of Boston	25,000,000	100	80	80½
Preferred	25,000,000	100	95½	96
Montreal Gas Co., Canada	2,000,000	100	218	218¾
Nashville Gas Light Co.	1,000,000	100	110	—
Newark, N. J., Con. Gas Co.	6,000,000	—	56	58
Bonds, 6's	6,000,000	—	137	138
New Haven Gas Co.	2,000,000	25	200	—
Peoples Gas Lt. & Coke Co., Chicago	25,000,000	100	110¾	110¾
1st Mortgage	20,100,000	1,000	—	—
2d "	2,500,000	1,000	104	—
Rochester Gas & Electric Co.	2,150,000	50	88	—
Preferred	2,150,000	50	118	—
Consolidated 5's	2,000,000	—	104¾	105¼
San Francisco Gas Co., Cal.	15,500,000	—	—	—
St. Joseph Gas Co.—				
1st Mtg. 5's	751,000	1,000	100	102
St. Paul Gas Light Co.	1,500,000	100	45	47
1st Mortgages, 6's	650,000	1,000	113	116
Extension, 6's	600,000	1,000	112¾	115
General Mortgage, 5's	2,465,000	1,000	90	95
Syracuse Gas Co., N. Y.	1,975,000	100	50	55
Bonds	2,047,000	1,000	100	104
Washington (D. C.) Gas Co.	1,600,000	200	360	380
1st Mortgage, 6's	600,000	—	—	—
Western Gas Co., Milwaukee	4,000,000	—	—	—
Wilmington (Del.) Gas Co.	600,000	50	361	—

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Special Courses of Demonstration Lessons

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10 Years' Experience.

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1805-3m

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Wanted by a man 29 years old, with 12 years of practical experience in all branches of the gas business. Strictly up to date on the manufacture of coal and water gas, fitting and distribution departments. First-class mechanic and can handle men and get results. Reconstruction of coal and water gas plants. First-class references.

Address, "BLUE PRINT,"

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Up to-date solicitor and new business man wants position with gas company in a city of 12,000 to 20,000. At present acting in capacity of manager. One who can get results.

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As Manager or Superintendent.

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Position Wanted

By a temperate man of 30, as superintendent or manager of a water gas plant. Thoroughly familiar with the manufacture, distribution, appliances, promotion of new business, etc.

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1811-1 Care this Journal.

WANTED,

Experienced Gas Range Solicitor,

For field which has never been worked. Salary and commission.

Address, CITY GAS COMPANY,

1810-2 WASHINGTON, IND.

WANTED,

Experienced Gasfitters and Caulkers,

By Western gas company. Permanent positions for competent men.

1810-2 Address, "COKE," care this Journal.

WANTED,

An Experienced Draftsman in Furnace Construction and Retort Bench Work.

Steady employment. Good salary to satisfactory party. Address, "B. Q.,"

1811-4 Care this Journal.

GAS MAKER (WATER GAS) WANTED.

Seven-Foot Six-Inch Machines.

Suburban to New York. Address, stating age, experience, and salary expected,

1811-1 Address, "S.," care this Journal.

FOR SALE,

SIX HUNDRED 3-LIGHT GAS METERS IN FAIR CONDITION.

Address, UNION LIGHT, HEAT AND POWER COMPANY,

1811-2 NEWPORT, KY.

FOR SALE,

One set of 4 purifying boxes 12 feet 8 inches by 10 feet 9 inches by 3 feet, in good condition, with centerseal and 10-inch connections.

1771-tf YORK GAS CO., York, Pa.

STANDARD REDUCTION FACTORS for GASES,
By Helon Brooks MacFarland, B.S., M.M.E.
Price, $1.50. *For Sale by*
A. M. Callender & Co., 42 Pine St., New York City.

FOR SALE,

Second-hand gas apparatus in good order. Selling because outgrown. Ready for immediate delivery.

One 6-foot Tufts' Station Meter, Hinman Drum, 10-inch connections.
One 5-foot Tufts' Station Meter, Hinman Drum, 8-inch connections.
One Standard Washer Scrubber and Standard, with inlet and outlet valves, 10-inch connections.
One No. 3 P. & A. Tar Extractor, 8-inch connections.
Two 3-blade McKenzie Exhausters, 8-inch connections.

NEW BEDFORD GAS AND EDISON LIGHT COMPANY,

1798-tf NEW BEDFORD, MASS.

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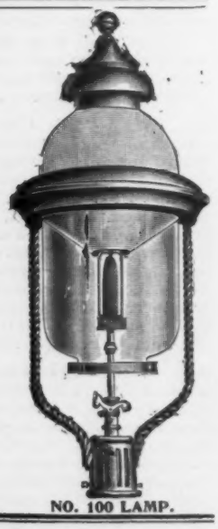

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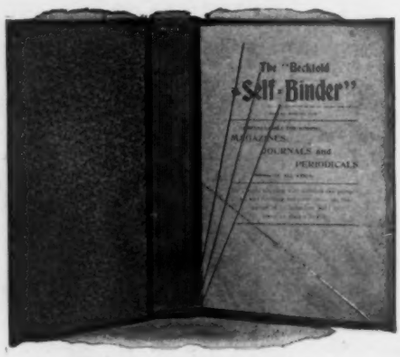

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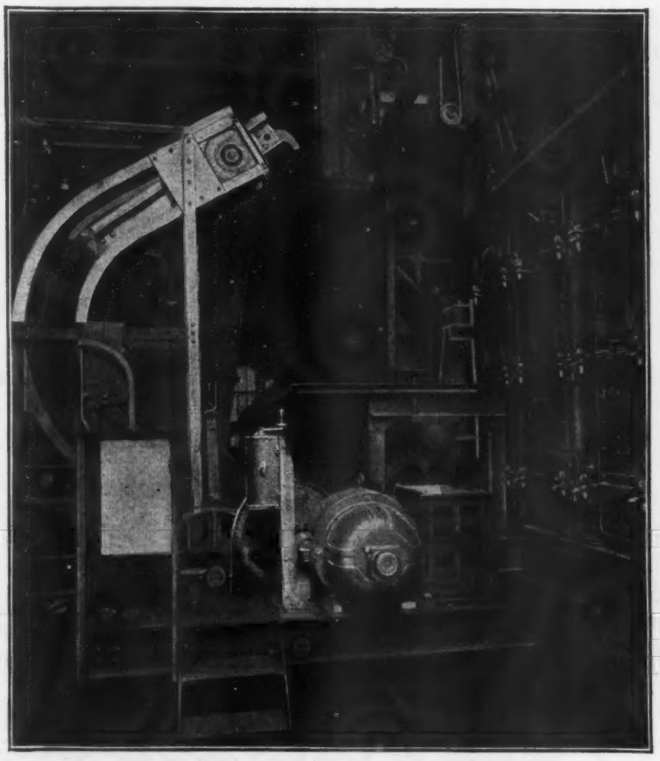

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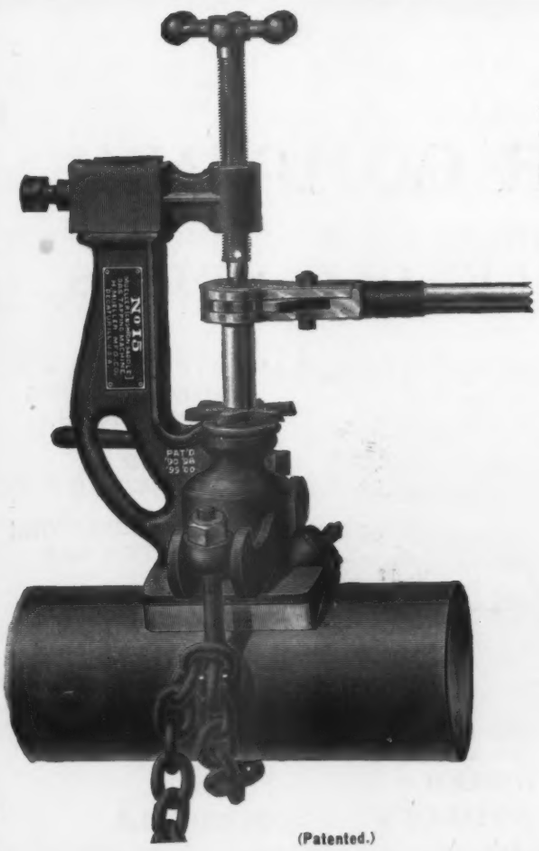

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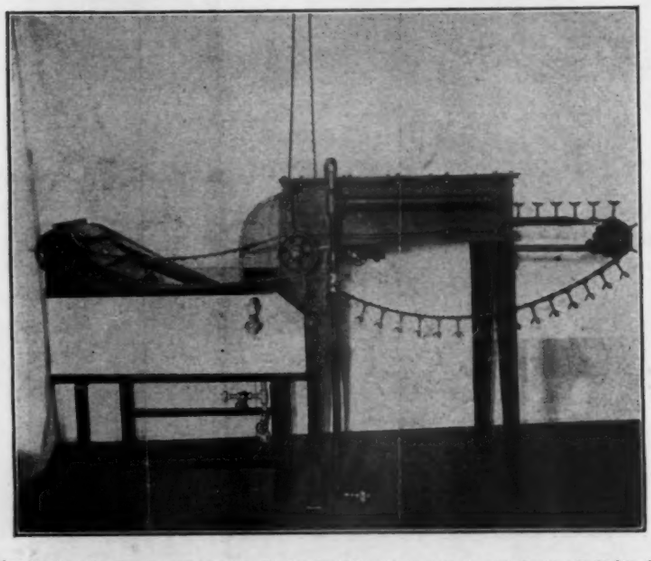

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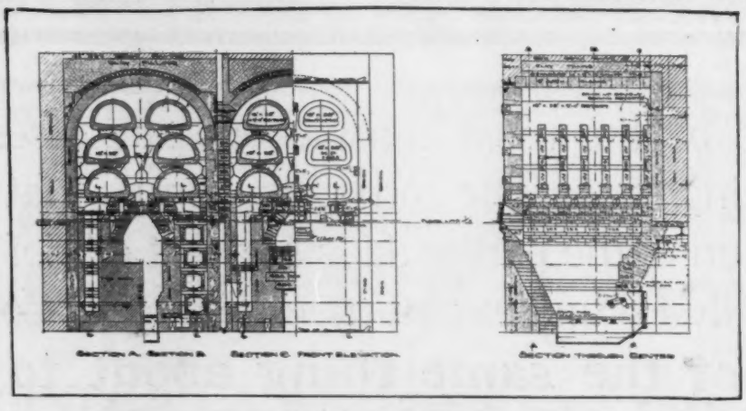

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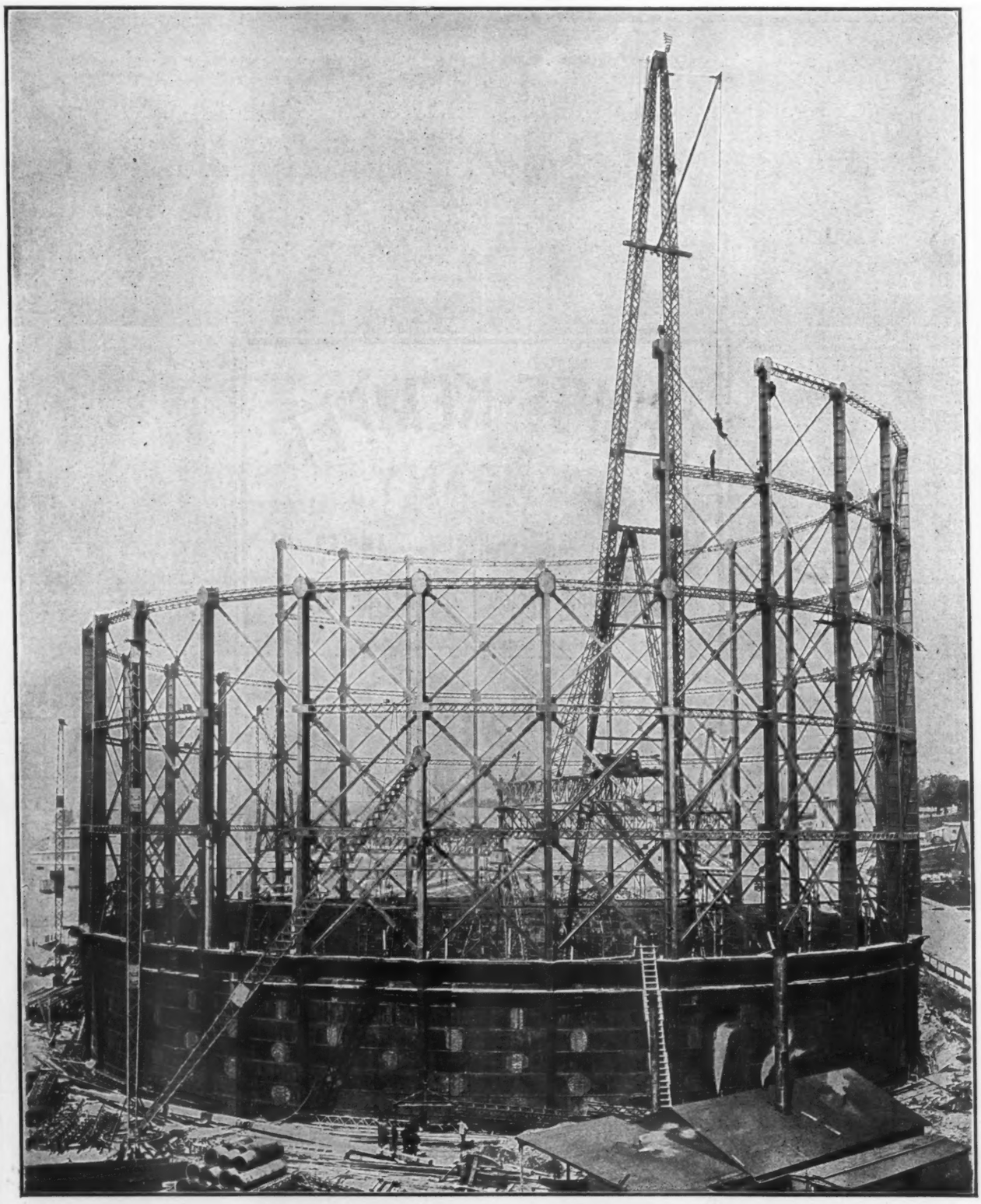

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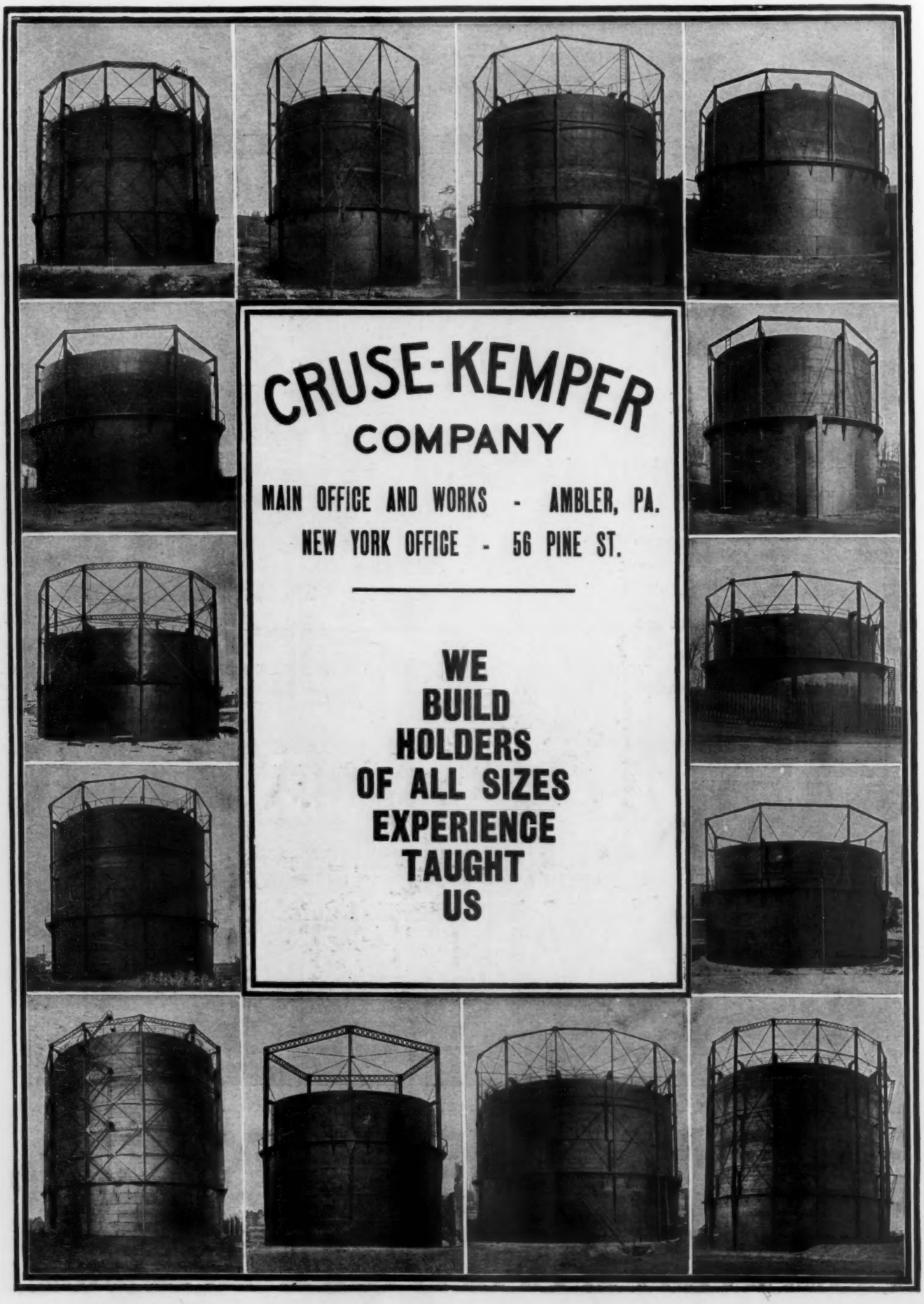
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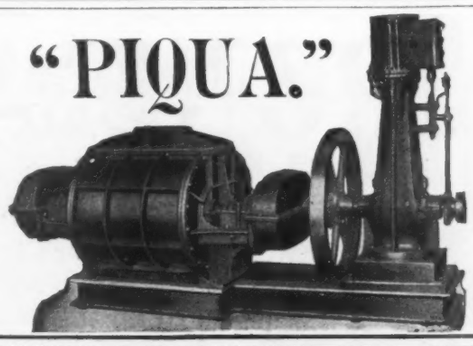

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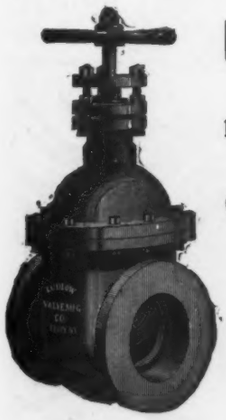

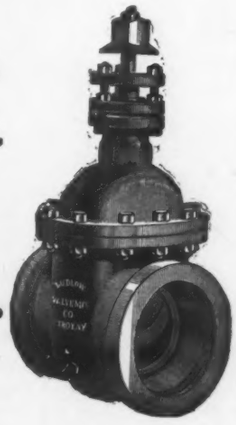

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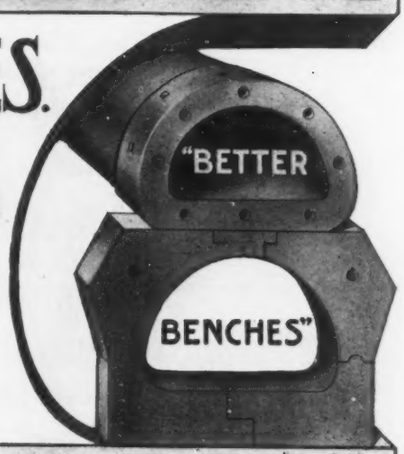

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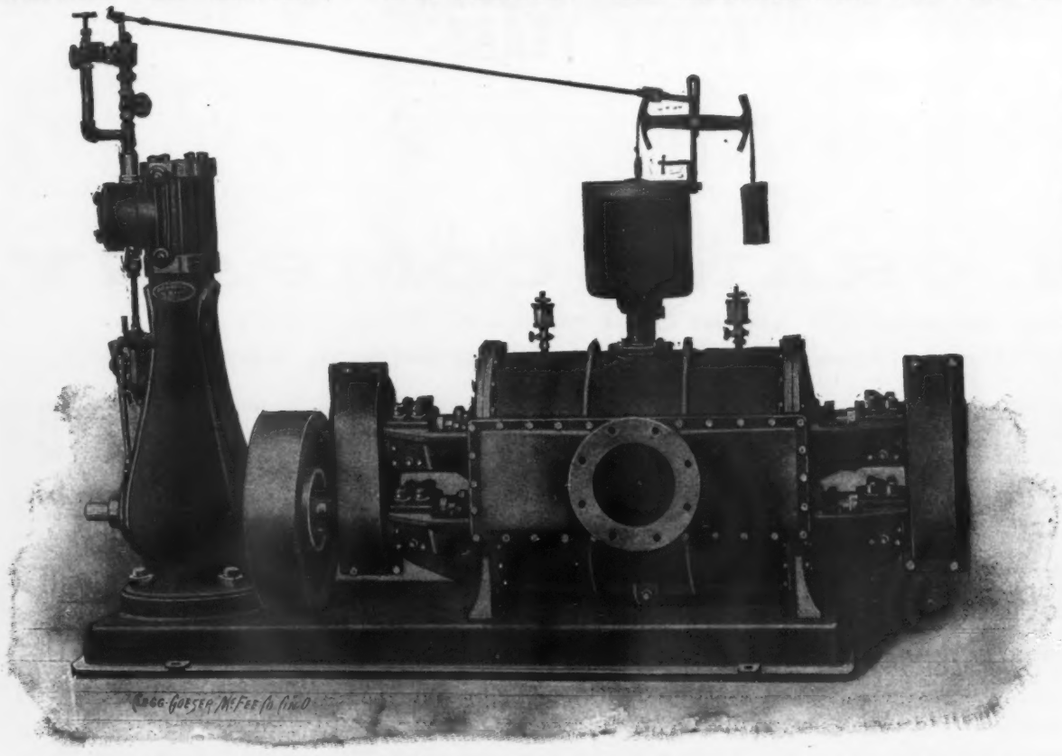

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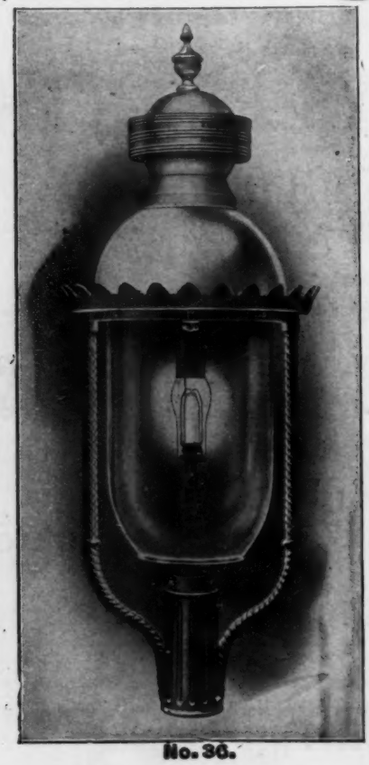

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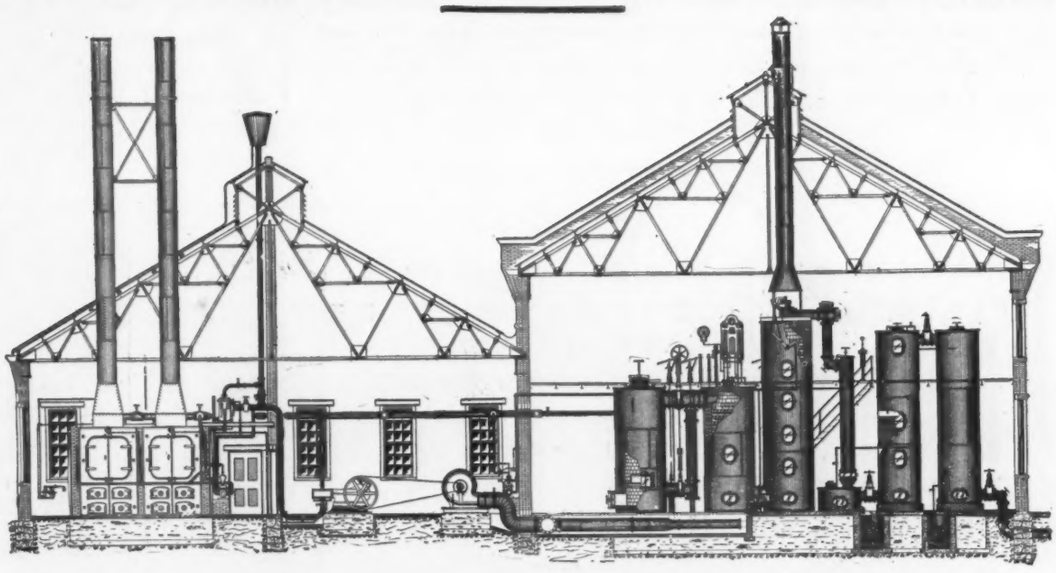

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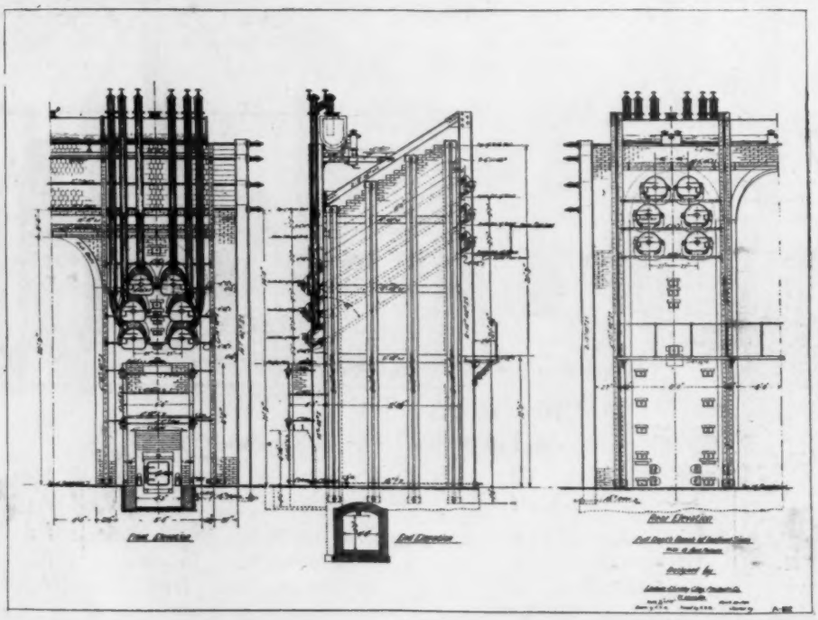

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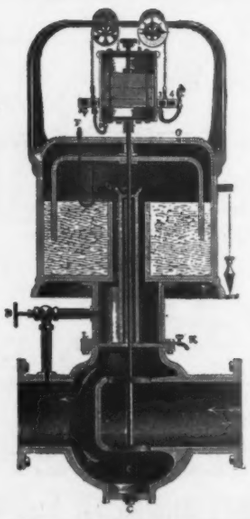

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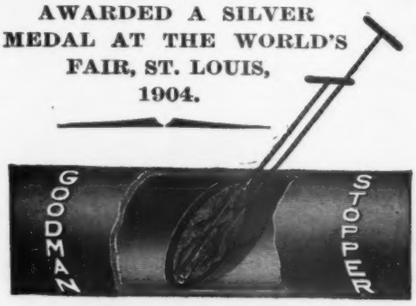

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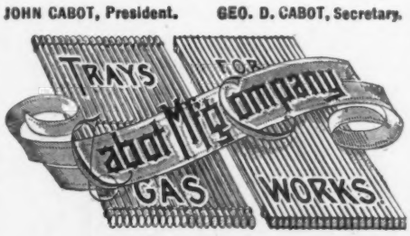

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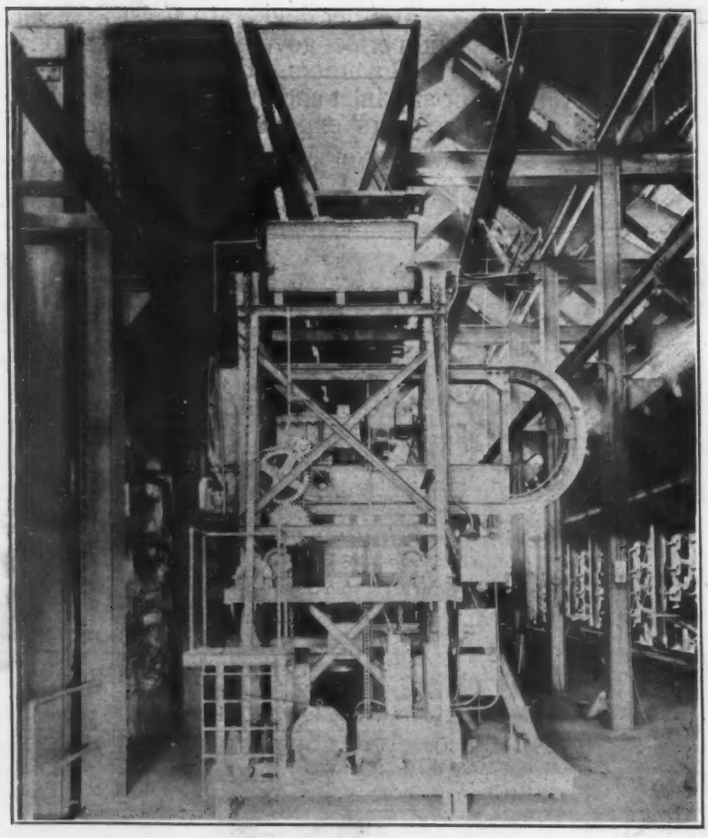

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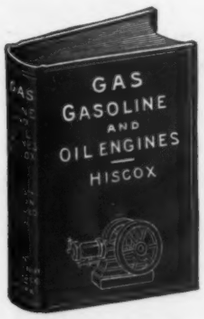

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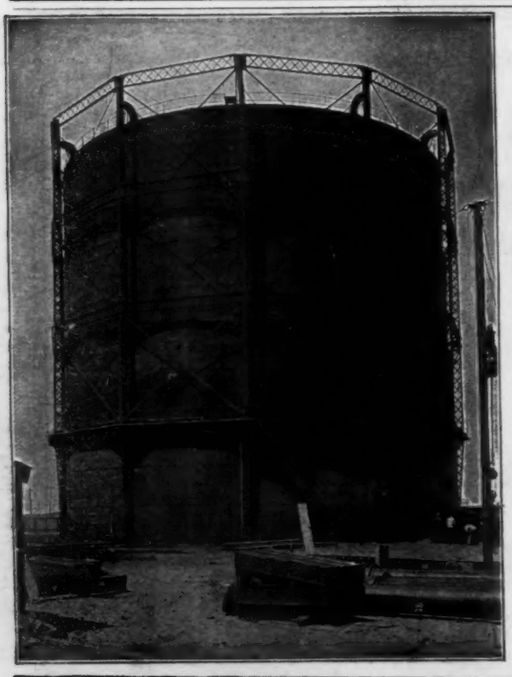

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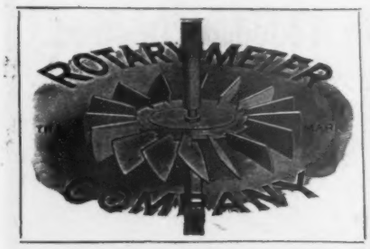

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